REVIEW AND APPROVALS

BENTON LAKE NATIONAL WILDLIFE REFUGE

Great Falls, Montana

ANNUAL NARRATIVE REPORT

Calendar Year 1988

Refuge Manager	Date	Zone Supervisor Review	Date

Regional Office Approval	Date

BENTON LAKE NATIONAL WILDLIFE REFUGE

Great Falls, Montana

Benton Lake (aerial) showing water and vegetational distribution as of June 27, 1988. Note lighter (yellow) areas of algae. Lake Creek inflow channel in foreground.
88p-3-17 06/27/88 DL

ANNUAL NARRATIVE REPORT
Calendar Year 1988

INTRODUCTION

Benton Lake NWR is located on the western edge of the northern Great Plains some 50 miles east of the Rocky Mountains and twelve miles north of Great Falls, Montana. Benton Lake is a 6,000 acre glacial lake bed with a 350 square mile water-shed drained by Lake Creek. The lake basins' bottom elevation is at 3,613 msl with a recent record high water level of 3,620.03 in the spring of 1979. Refuge marshes are surrounded by short grass native prairie, primarily composed of western wheatgrass and green needlegrass, and some planted stands of dense nesting cover (DNC).

The refuge was established in 1929 when President Hoover set aside, by Executive Order, the original 12,235 acres for "use as a refuge and breeding grounds for birds". The unit was unmanned until 1961. Water supplied by natural runoff into Lake Creek occasionally provided good waterfowl production years - its potential was proven but good water years were too infrequent. Habitat conditions adequate to support waterfowl production, migrational use and hunting use were undependable.

Local support and political pressure finally resulted in the Fish and Wildlife Service obtaining a major supplemental water source in 1957 - - return irrigation flows in Muddy Creek from the Greenfields Irrigation District. Subsequently, a pumping station and associated delivery systems into Lake Creek were developed to provide water annually to Benton Lake. The old glacial lake bed was subdivided into six marsh units with dikes and control structures to allow independent diversion into these units.
The headquarters complex was completed in 1962 and personnel assigned for active management.

In the 1960's management was concerned with stabilizing and protecting the new dikes and water control structures. Grazing intensity was reduced to improve range conditions. Shelterbelt shrub and tree plantings were undertaken. Six hundred acres were broken out of the native grasslands and planted to small grains for supplemental food supplies for increasing waterfowl numbers.

In the 1970's the 600 acres of cropland were gradually converted to DNC. Cattle grazing was terminated to improve nesting cover conditions on the native grasslands. Studies at Benton Lake indicated an annual use of as many as nine duck nests per acre on DNC units and about a tenth that rate on native grasslands. Botulism, a poisonous toxin producing bacteria, became a serious problem with up to 20,000 birds lost in one year.

In the 1980's new management thrusts began focusing on increasing emergent cover distribution in refuge marshes through the use of an inter-unit pumping system. The four lower units have been operated at a shallower water depths and the accumulating excessive salt load (TDS) gradually flushed into Unit IV to try to freshen the water in the other units.

The heart of the refuge water management system is the dam and pumphouse located on Muddy Creek near Power, Montana, some 28 miles west of the refuge. Three 350 horsepower electric pumps elevate water 140 feet through a five mile 48" concrete pipeline over the divide into the Lake Creek Watershed where it then follows a channelized creekbed into Benton Lake. The pumping station has supplied about 7,000 acre feet annually to maintain refuge marshes at an average cost of $40,000 to $50,000.

Nesting islands and artificial nesting structures, such as round straw bales, have been used in combination with a temporary hunting season closure to stimulate local production of Canada geese. Botulism hazards have been reduced by developing complete drainage capability on each unit by ditching. Cleanup operations have also helped to keep losses under 2,000 per year in recent years. Water surface acres have been reduced somewhat to help offset the deficit in nesting cover and to help reduce energy costs.

Benton Lake is now one of the most productive waterfowl refuges in the United States. Annual duck production has exceeded 39,000 but averages closer to 20,000. Canada goose production has reached 312 and is increasing.

Of some 378 bird species known to visit Montana, 206 have been recorded at Benton Lake and new ones are observed each year and added to the bird list. Other migratory birds that reproduce here by the thousands include Franklin's gull, eared grebe and the American coot. Upland game birds such as gray partridge and ring-necked pheasant have responded well to the improvements in upland food and cover.

The refuge also serves as an important migration stopover. During the spring and fall migrations, up to 100,000 ducks (April and September), 7400 tundra swans (April and November) and 2,500 Canada geese (November) use refuge marshes. Use by the endangered bald eagle and peregrine falcon has increased in recent years.

The marshes are too shallow to support a fish population. Twenty different species of mammals occur. White-tailed jackrabbit and the long-tailed weasel are frequently seen in the winter, while Richardson's ground squirrels, yellow-bellied marmot and the muskrat are often seen by summer visitors. Both species of deer and the pronghorn are seen in low numbers on the refuge.

Public use is limited to day use from March through November of each year. The local school system uses the refuge for well organized environmental education field trips in May studying plants, birds and insect life. A hunting program is conducted on part of the refuge in October and November for waterfowl and a limited harvest of upland game birds. Most of our visitors enjoy observing or photographing wildlife from the nine mile auto tour route. There are no facilities on the refuge for picnicking or camping.

INTRODUCTION

TABLE OF CONTENTS

Page

G. WILDLIFE

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

Page

J. OTHER ITEMS

K. FEEDBACK Nothing to Report

L. INFORMATION PACKET (inside back cover)

A. HIGHLIGHTS

Benton Lake NWR was designated a fee area in January. 21

Spring water conditions were the worst in several years and significantly reduced waterfowl nesting this year. 27

Tundra swan use set new spring and fall use records at Benton Lake due to extreme drought conditions in this area. 34

The new 200 HP pump was installed at the Muddy Creek pumpsite on April 12th and pumping operations were initiated for the year. Water was brought back up to operating levels in the marsh units by extensive pumping. This was about one and one-half months behind the target date. 61

The annual Interagency Montana Spring Waterfowl Tour included a tour and barbecue dinner at Benton Lake on May 25. 19

Selenium continues to be a contaminant of concern at Benton Lake. Contaminant sampling continued and eggs collected at nests were examined in the lab for embryo deaths and abnormalities. 5

Refuge staff members were tested for selenium in December. . . . 23

Refuge Assistant Betty Benway received her 20 year Service Certificate from Associate Manager Barney Schranck. 16

The refuge staff did an outstanding job of remodeling the refuge office. 62

Tom Pabian and Vince Marko complete installation of the guard rail made by Vince for the new handicapped entrance ramp.
88p-4-20 RLP

B. CLIMATIC CONDITIONS

The drought continued to plague north-central Montana with precipitation well below normal. Unusually warm temperatures were recorded throughout most of the year, however, for the third year in a row, the temperature failed to break the century mark.

Eight inches of snow were received on January 11th but it didn't last long due to warm weather and chinook winds. February continued the warm dry trend with wind gusts of 61 miles per hour recorded in Great Falls. Some damage to power lines and trees was recorded.

Drought and pumping problems led to very poor spring water conditions. Unit V was down to mostly mud flats with island nesting exposed and water left in only two small basins and the borrow ditches and canals by early May.
88-8-5 05/03/88 RLP

March, April and May continued the warm, windy and dry pattern. June was the warmest on record since 1892 and new record highs were set on three different occasions.

July finally brought some much needed precipitation and slightly cooler weather. Severe thunder storms hit the area on the 3rd, 4th and 5th of the month. On July 5th a tornado touched down near Great Falls causing some property damage. August was cool and dry and the area was blanketed by thick smoke caused by forest fires in western Montana.

In early September rain finally fell over most of the state and cleared the air of smoke. Heavy wet snow fell on the 16th through the 18th and snapped power poles west of Great Falls causing prolonged power outages to many areas, including our pumping station on Muddy Creek.

October was warm and dry except for rain on the 16th and a snowstorm on the 26th which dropped over 5 inches of snow. November was another warm month with only six inches of snow received. December was warmer than normal with some much needed precipitation. The area had a white Christmas when 3.5 inches of snow fell that day.

The weather information on the following table was provided by the National Weather Service at Great Falls International Airport, some 18 miles southwest of the refuge. There are considerable differences in both temperatures and precipitation between the two locations. The refuge usually receives more snow than Great Falls but the annual precipitation is somewhat less, or, in the case of 1988, considerably less.

TABLE I

WEATHER TABLE - 1988

	GREAT FALLS				REFUGE
	Temperature (F)		Precipitation		Precipitation
	High	Low	Total	Depart	Total
January	57	- 13	.76	- .24	.61
February	67	- 15	.47	- .28	.32
March	69	14	.44	- .14	.72
April	81	23	.77	- .72	.38
May	92	29	1.60	- .92	1.99
June	99	42	1.42	-1.33	.03
July	97	44	1.82	.72	.89
August	96	43	.26	-1.05	.05
September	90	32	2.33	1.30	2.39
October	80	11	.66	- .16	.28
November	65	- 2	.30	- .44	.15
December	58	- 9	.97	.17	.55
1988	99	- 15	11.80	- 3.44	8.36

C. LAND ACQUISITION

1. Fee Title

A letter was sent to the Bureau of Reclamation and the BLM requesting that the FWS be given permanent control over a 80 acre tract adjacent to our Muddy Creek pumpsite. We

currently lease the land from the Greenfields Irrigation District (GID) for a $270.00 annual fee. The land was originally withdrawn from the BLM as part of the Sun River Project. The Bureau of Reclamation declined our request while the BLM supported our proposal.

D. **PLANNING**

2. Management Plans

Annual plans submitted to the Regional Office included the Burn Plan, Water Management Plan, Pesticide Use Proposal, Fire Dispatch Plan, Written Communication Hazard Plan, and Annual Work Plan. A final report detailing refuge trapping and predator control was prepared as part of the three year study called for in the Predator Management Plan.

As part of the new refuge planning guidelines, planning, background, and operating statements were completed for the station.

4. Compliance with Environmental and Cultural Resource Mandates

The refuge hunting program was reviewed for NEPA compliance and the annual Section 7 review.

5. Research and Investigations

a. BIO/WEST Powerline Study - Lake Creek Flat

The following are excerpts from the Autumn 1988 Interim Report entitled "Great Falls-Conrad 230KV Transmission Line Post Construction Bird Monitoring Study", BIO/WEST, Inc.

"In 1985, Western Area Power Administration completed construction of a 230-kv transmission line between Great Falls and Conrad, Montana. The environmental impact analysis prepared for this project expressed concern for the potential impact the transmission line may have as a collision hazard to geese and other migratory avian fauna (DOE 1983). In this regard, BIO/WEST was contracted by J.F. Sato and Associates to monitor the line in areas of potentially high avian flight intensity to determine if mitigation measures were necessary to reduce avian mortality due to collisions with the transmission line. Data collected on avian flight response and mortality during autumn 1987, spring 1988 and autumn 1988 constitute 75% of the data set. The upcoming spring of 1989 represents the final season of data collection.

Field personnel conducted a total of six search transects along Lake Creek Flats (LCF) covering 3.56 miles on each side of the transmission line to the southeast of the LCF observation station.

A total of 4 ducks and 18 passerine species were found and considered part of collision mortality for the autumn 1988 searches. This compares with a total of 15 found in the spring of 1988 (6 ducks, 1 shorebird, 1 raptor and 7 passerine species) and 110 found in autumn 1987 (23 ducks, 16 shorebirds, 2 raptors and 69 passerine species.

The six Lake Creek Flats search transects covered a total of 21.36 miles, resulting in a search index of 0.19 birds per mile of search for target species (i.e., waterfowl, raptors and shorebirds). This compares with the search index in spring 1988 of 0.26 birds per mile of search and in autumn 1987 of 1.34 birds per mile. The high index for autumn 1987 is probably attributable to the fact that many avian remains located at that time may have been present as far back as completion of the transmission line in 1985, while the following spring and fall 1988 reflected collision mortalities over a more discrete time interval."

b. Interagency Screening Study

The refuge received the final report for the 1986-1987 Interagency screening study on contaminants.

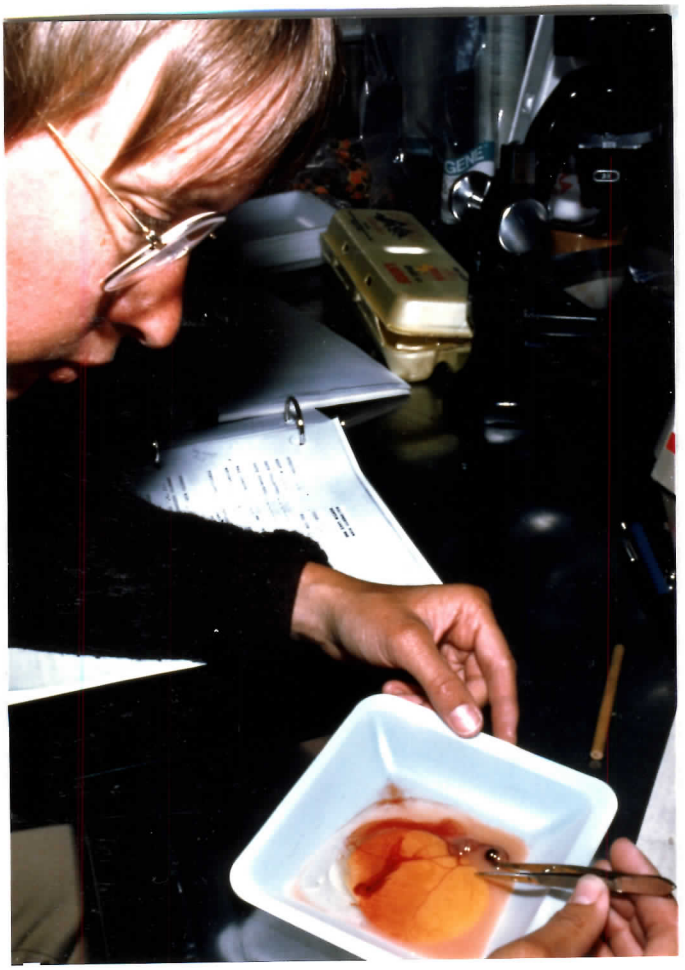
c. Selenium Study by Fish & Wildlife Enhancement

The refuge staff helped John Malloy collect additional samples of eggs and birds for selenium analysis. John collected added samples of sediment, invertebrates, plants, eggs and birds to strengthen their data base in marsh units I and IV. Lab results have not yet been received and analyzed. This study underwent a supervisory change with Bill Jones' transfer to Denver and Don Palowski transferring in from California.

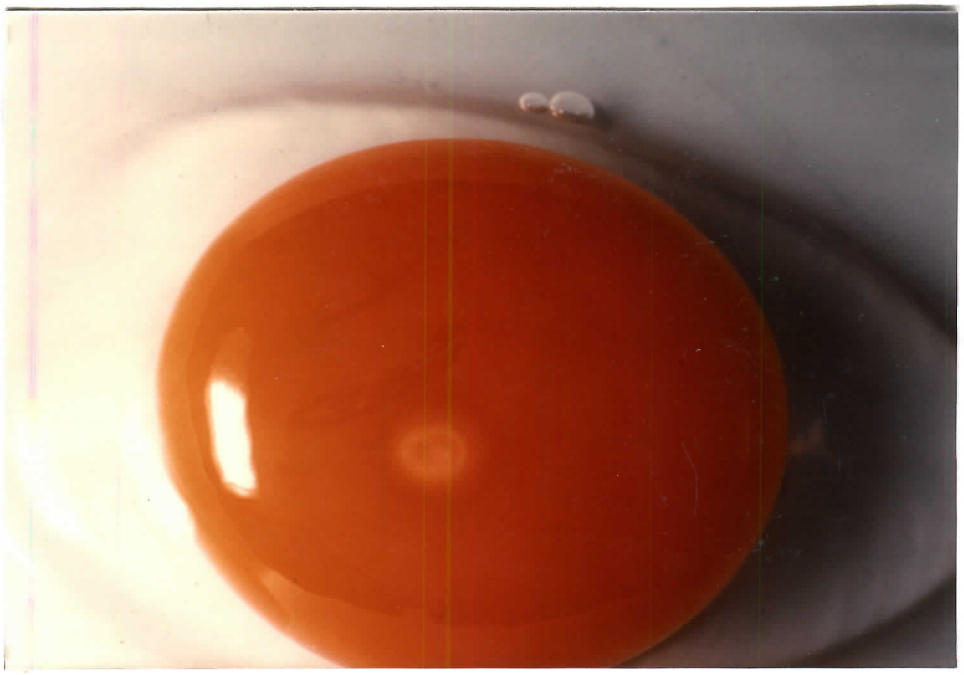
d. Refuge Study of Selenium Caused Abnormalities in Duck Egg Embryos

The following is the abstract from the 1988 Report on Contaminant Studies by Kristi DuBois:

Selenium was first suspected as a contaminant at Benton Lake when a 1985 article by Tom Harris in the Sacramento Bee probed the possibility of a widespread selenium problem which had already been linked to wildlife deformities at Kesterson National Wildlife Refuge. A study was initiated in 1987, and expanded in



Bio Aid Kristi DuBois examined some 607 duck eggs that had been left unhatched in nests this summer. The study was trying to detect obvious physical abnormalities in unhatched ducklings that most likely were being caused by excess levels of selenium.
88-20-013 05/17/88 DL

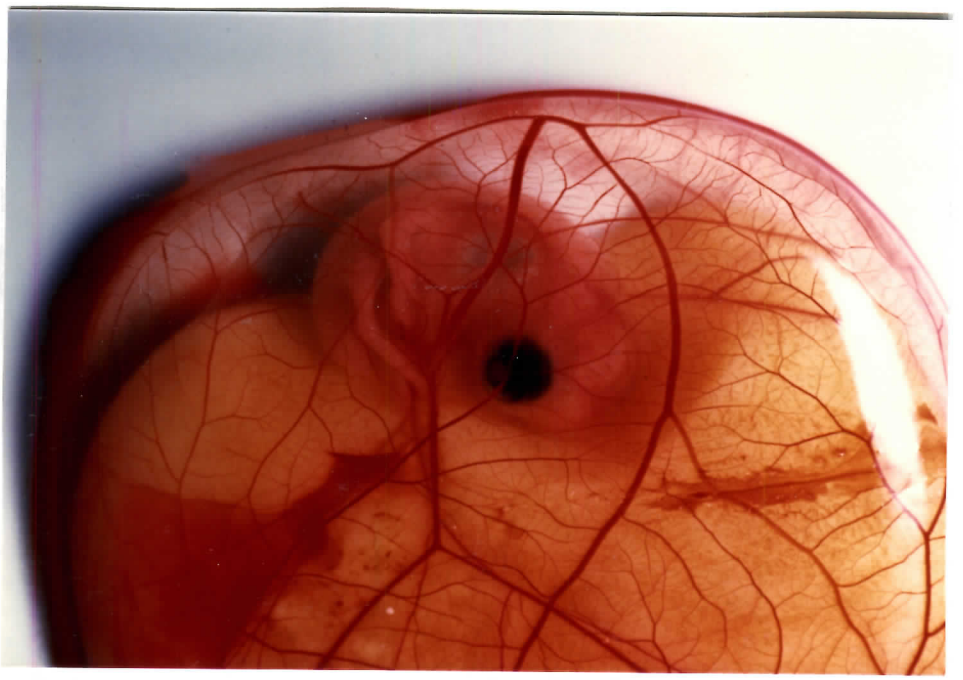


A fertile shoveler egg. We weren't confident of being able to detect embryo abnormalities until about the 15th day of growth.
88-20-020 05/19/88 KD

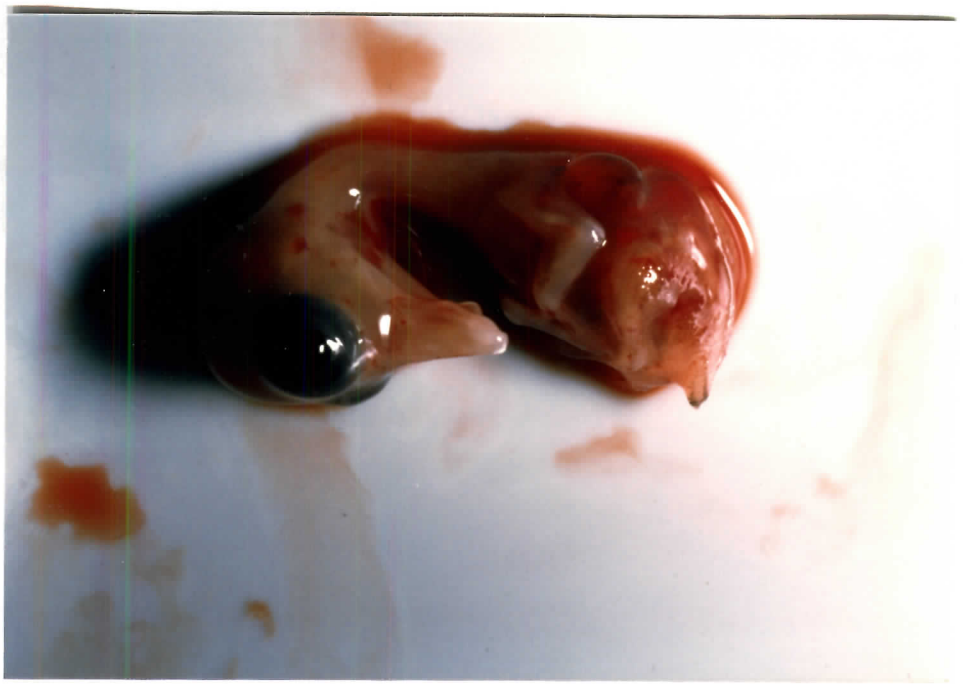
1988 to determine if nesting duck populations on Benton Lake NWR exhibited any symptoms of selenium contamination. Sampling of refuge habitats and wildlife for the presence of known contaminants, mainly boron and selenium, was conducted in 1988 under the Fish and Wildlife Enhancement program.

The refuge embryo study in 1988 included collection and lab analysis of all eggs left in nests found during the duck nest survey. Eggs remaining in successful, destroyed, or abandoned nests were collected and examined in the refuge lab to determine fertility, embryo age, and embryo deformities.

Of the 438 nests monitored during the nesting surveys, 205 (47%) had eggs remaining after termination. The number of eggs remaining totalled 607 eggs. Species composition of the eggs was similar to species composition of the nests located during the study. The eggs were distributed roughly in proportion to the number of nests found in each unit.



This 10 day old pintail embryo appeared normal, but abnormal development at this stage may not be easily detected in many cases.
88-20-020 05/19/88 KD



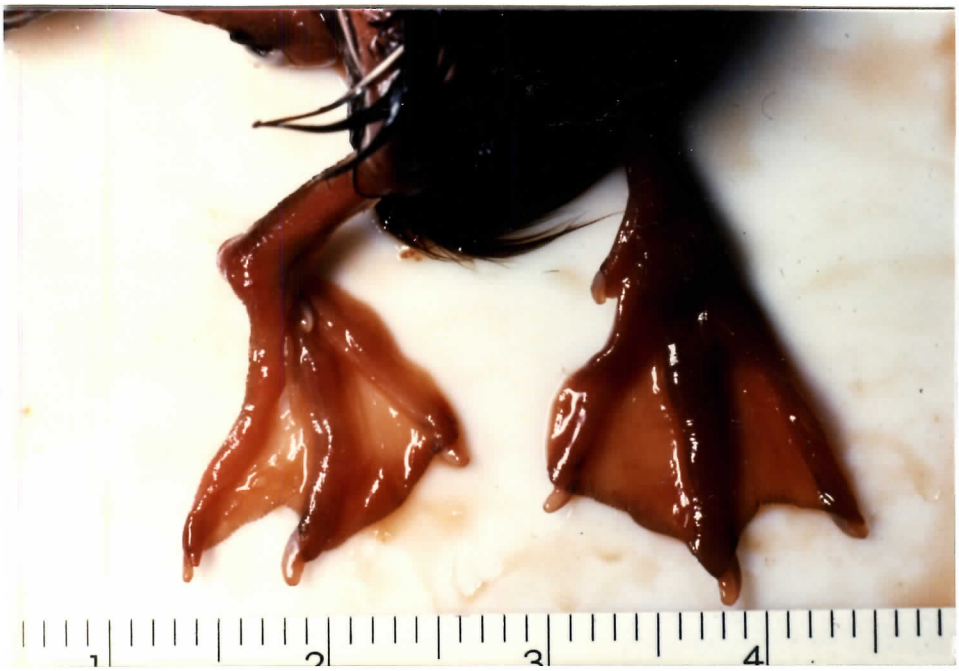
This 15 day old mallard embryo appears to be normal. Note the bill configuration for comparison to the following photo.
88-20-057 06/07/88 KD

A 14 day old gadwall appeared to have a foreshortened upper mandible, and this specimen was sent in for chemical analysis. Results not yet received back from Patuxent.
88-20-129 07/21/88 KD

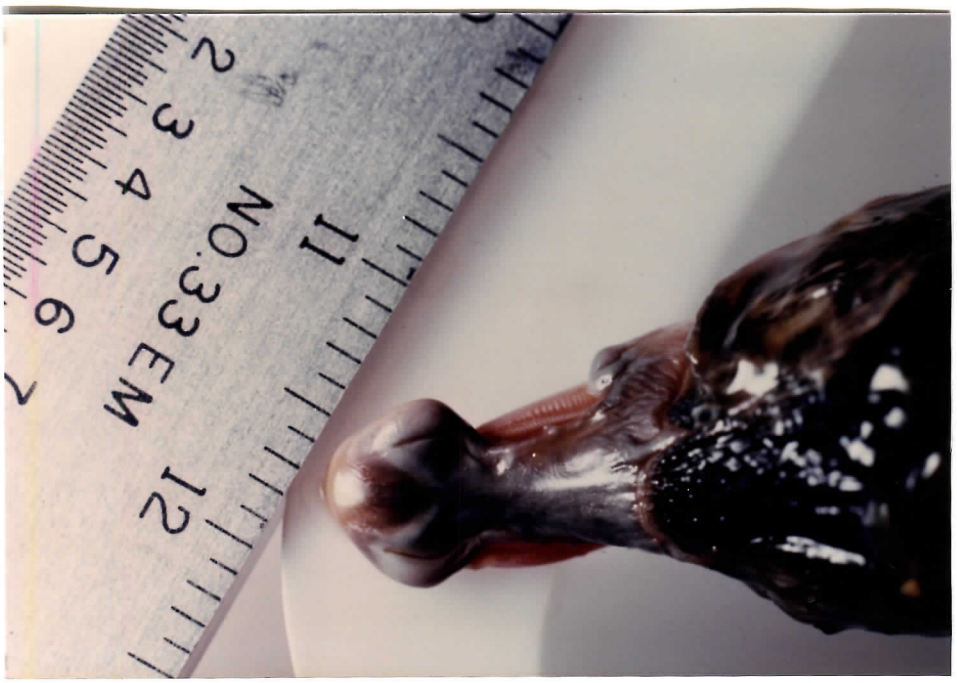
Of the remaining 205 nests with eggs, 58 were successful nests with fertile eggs remaining, indicating embryo death. This represents 17.2% of the 337 successful nests found during duck nesting surveys in 1988. Of 350 eggs collected from successful nets, 87 (24.9%) contained dead embryos and 2 (0.6%) contained abnormal embryos.

Eleven eggs (collected from 10 different nests) contained embryos with suspected abnormalities. These were sent to Patuxent Wildlife Research Center to be examined by David Hoffman prior to chemical analysis. He concluded that three of the embryos were abnormal, five were normal, and three were too badly deteriorated to examine accurately.

The causes of the embryo death and deformities observed at Benton Lake cannot be assessed until the chemical analysis has been completed on the 1988 samples. Possible causes of embryo death besides selenium contamination included: improper care by the hen, handling of the eggs during nest inspections, other contaminants and weather. The weather at Benton Lake was abnormally hot and dry during 1987 and 1988.



This 22 day old mallard embryo appeared to have a deformed foot and it was also sent in for further analysis.
88-20-085 06/28/88 KD



Old alligator "Bill". This lesser scaup embryo died at 23 days and shows the most definite physical abnormality found by Kristi in the 607 duck eggs.
88-20-143 08/02/88 KD

A side profile of the same lesser scaup embryo shows obvious upper bill deformity. Observed deformity rates at Benton Lake were considerably less than those found by Ollendorf at Kesterson.
88-20-134 08/02/88 KD

Reduction in effective clutch size due to embryo death ranged from 0 for redheads to 5.9% for cinnamon teal. The average reduction in effective clutch size for all species was 3.0%, indicating that embryo death was probably not a significant factor affecting duckling production in 1988. The average reduction in effective clutch size due to all non-viable eggs (infertility and embryo death) was 12.1%. The results from the chemical analysis should help reveal the role of selenium and other contamination in influencing duck production. Although some past Benton Lake samples were within the range of contamination seen at Kesterson NWR, Benton Lake does not appear to be experiencing excessive levels of embryo abnormalities or chick and adult mortality from selenium toxicosis.

e. Saline Seep Wells

The Montana Salinity Control Association came in and sealed off the flows from the four monitoring wells that their predecessor (Triangle Conservation District) had installed in 1980. Corrective land management "plans" drawn up by them with the adjacent neighboring

The massive discharge of toxic salts along the south edge of Benton Lake is illustrated by this saline seep along the shoreline and dike dividing Units VI and IVc. Some of the highest readings of selenium were obtained at the seep to the right of the dike.
88-13-29 06/27/88 KD

landowners never materialized into land use treatment, so they gave up. Three of the four wells have maintained a steady record of surface flows since first installed.

Aerial of Unit V (foreground) and VI. Note the aforementioned seep at the upper right of the photo. This shows the highest water level reached this "spring". Almost 2 months too late. Coyotes destroyed several goose nests on the islands in V during the low water period in May.
88-12-26 06/27/88 KD

6. Other

Budget and Procurement Exercises

A master list of refuge projects (ARMM's, Resource etc.) was prepared using a RO database. Work began on the Maintenance Management System but was bogged down by some pretty vague directions and documentation. Input was provided for the Maintenance Management System and a regional Master Project list. Top projects listed for this station included a monitoring system at Muddy Creek pumpsite, and a pilot contaminant abatement program.

Why didn't the FWS put a trained and qualified team in the field to do the job right (engineering inspection) on the Maintenance Management System?

We issued a requisition for a second computer in FY 87 - -- we were finally told that there wasn't enough time to get it processed before the end of the fiscal year. We then waited until the start of FY 88 and revised and reissued a requisition to include a desk top and two lap top computers and the associated software. In October, 1988, we tried to obtain approval to purchase a lap top computer directly off the established GSA contract! Request denied. Region Six's attempt to get into the computer era has had an unusual amount of snags. It appears to be the victim of the bureaucratic monster. There is too much concern over turf protection and not enough focus on getting the job done of providing for the needs of field operations. This agency's efforts to get computers has failed again in FY 89.

E. ADMINISTRATION

1. Personnel

3 6 4 5 1

PERMANENT PERSONNEL

1. Robert L. Pearson, Refuge Manager - GS-11 - EOD 08/27/77
2. David D. Linehan, Assistant Manager - GS-9 - EOD 09/23/86*
3. Gary L. Sullivan, Assistant Manager - GS-9 - EOD 02/01/87
4. Elizabeth A. Benway, Refuge Assistant - GS-5 - EOD 07/28/68
5. Vincent J. Marko, Eng. Equip. Operator - WG-10 - EOD 04/30/62
6. Patrick T. Nies, Maintenance Worker - WG-7 - EOD 09/28/88

*Transferred to McNary NWR 10/06/88

TEMPORARY PERSONNEL

7. Clarke A. Dirks, Bio Aid - GS-4 - 03/27 - 12/31/88
8. Thomas M. Pabian, Bio Tech - GS-5 - 04/10 - 12/31/88
9. Kristi L. DuBois, Bio Aid - GS-4 - 04/24 - 12/23/88
10. Karen A. Swanberg, YCC Enrollee - 07/05 - 08/26/88
11. Lars M. Swensen, YCC Enrollee - 07/05 - 08/26/88

7 9 8

11 10

Clarke Dirks was recruited as a rehire to fill one of the two biological aid positions available this year. Clarke worked at Devil Lake WMD in 1987 and was well qualified to help with our trapping, banding and nest dragging operations. He reported for duty on March 27th and proved a valuable addition to the staff. Clarke also assisted with the office remodeling project and vehicle and equipment maintenance. In recognition of his outstanding performance this summer at Benton Lake, Clarke was presented with a special performance and monetary award. His appointment was terminated on December 31st.

Thomas Pabian was hired as a bio tech on a temporary appointment for the wetland management district and reported for duty on April 11th. During his tenure he assisted with many fencing and posting projects on the district, as well as site cleanup. Tom assisted with the nest dragging, botulism surveillance, temporary office construction and office remodeling projects. His appointment was terminated on December 31.

Kristi DuBois filled the second bio aid position on April 24. During her tour of duty she assisted with the nest dragging and banding program. A large part of her time was devoted to the contaminant study and she spent many hours examining over 600 eggs collected for the study. Her computer skills were put to good use in completing the contaminant report, nesting study report, revised refuge bird list and various other data base records. Her appointment expired on December 23rd.

Dave Linehan transferred to McNary NWR on October 8th, after spending two productive years at this station. His administrative and computer skills will be sorely missed.

Steve Martin, biologist from Medicine Lake NWR, was selected as the new assistant refuge manager and is scheduled to transfer in on January 29, 1989.

In October ARM Gary Sullivan was promoted to Refuge Manager, GS-9. A special performance award certificate and monetary award were presented to Gary for his outstanding performance during the year. He accomplished his many duties in the wetland district and devoted a large amount of time to the Farm Bill Program. In FY 89 he will spend six months of his time assisting Farm Bill Coordinator Jim Stutzman with the various programs in Montana - a large area for two people to cover.

In November Refuge Assistant Betty Benway was presented with a 20 year certificate and charm by Associate Manager Barney Schranck. She was also presented with a beautiful bouquet containing 20 gold chrysanthemums to commemorate her 20 years at Benton Lake.

The new"Associate Manager" Barney Schranck was asked to present Elizabeth "Betty" Benway with her 20 year service certificate and pin at a special coffee and cake break in the new staff room. Twenty flowers were presented from the crew in appreciation for her many years of support to her fellow employees
88p-4-1 RLP

Permanent and seasonal employees were certified to operate forklift, loader/backhoe, farm tractor and heavy trucks by Clayton Christensen from CM Russell NWR (far right).
88p-1-10 RLP

Training

Pearson, Linehan, Sullivan and Benway completed 91 hours of dBase training at the Great Falls VoTech Center. The instructors were extremely cooperative in helping set up specific programs to suit individual needs.

In January Pearson attended a one week Law Enforcement Inservice Training at the new FLETC in Marana, Arizona. Linehan and Sullivan attended the same training in February. In August Pearson and Sullivan attended a law enforcement workshop and pistol qualification at C.M. Russell NWR.

In June Pearson attended a seminar "How to Work with People" in Missoula and attended a NEA training session "Southwestern Montana Riparian Site Types" in Dillon.

In June Linehan attended the S-390 Fire Behavior course in Boise, Idaho.

In August Benway attended a "Managing Secretarial Stress Seminar" in Great Falls.

In July CMR's Clayton Christianson spent a day at the refuge and provided operator's certification for Sullivan, Linehan, Pabian, Dirks and DuBois on the backhoe, tractor and forklift.

ARM Linehan provided ATV training to the seasonal hires using the FWS ATV manual and materials from the Specialty Vehicle Institute of America.

Meetings

Pearson: Montana Water Developers Association - - Fairfield
Contaminant/Water Quality - FWS - - - - Lewistown
MT Fish, Wildlife & Parks Volunteer Orientation - - - - - - - - - - - - - -Great Falls
Spring Waterfowl Tour - - - - - - - - - -Freezeout, - - - - - - - - - - - - - Benton Lake, Canyon Ferry
Audubon Tour - North Fork Ranch, McCormick WPA - - - - - - - - - - - - - - - - - -Ovando
Ecology and Management of Islands, Peninsulas and Structures for Nesting Waterfowl - - Jamestown, ND

Linehan: Spring Waterfowl Tour - - - - - - - - - Freezeout, - - - - - - - - - - - - - - Benton Lake, Canyon Ferry

Sullivan: Spring Waterfowl Tour - - - - - - - - - - Freezeout, - Benton Lake

Pearson, Linehen and Sullivan attended the Project Leaders meeting in Lewistown and Pearson attended at West Yellowstone.

The 1988 Interagency Spring Waterfowl Tour assembled at the Muddy Creek pumping station after a morning tour of the Freezeout Lake Waterfowl Management Area led by Frank Feist.
88-9-01 05/15/88 DL

Benton Lake Refuge personnel hosted the after tour barbecue at our headquarters - the new carpenter shop area served us well. A good time was had by all.
88-9-8 05/25/88 RLP

TABLE II

PERSONNEL

FY	Full Time	Temporary	YCC	FTE
1988	6	3	2	8.2
1987	6	2	2	6.3
1986	6	3	2	6
1985	5	2	2	5.9
1984	5	2	2	5

FTE's does not include YCC

2. Youth Programs

Two YCC enrolles were recruited through the school counselors at the two local high schools.

Great Falls High School junior, Karen Swanberg, and recent CM Russell High School graduate, Lars Swenson, entered on duty July 5th. We delayed the start of the YCC program this year so that YCC'ers would be around during the last week of August to assist with duck banding.

During their 8 week tour of duty they assisted with the following projects: noxious weed pulling and junk/debris cleanup at Muddy Creek; headquarters area, DU dedication and kiosk site weeding and trimming; nest dragging and nest checks; assisting with botulism pickup; vehicle and airboat cleaning; removal of old foot bridges and site cleanup on refuge; repair of duck traps and banding; pulling and cleaning of predator traps; fence repair and site cleanup at Big Sag and Jarina WPA's; office remodeling project; refuge boundary fence repair and Quarters 82 fence construction; and sign and post removal along auto tour route and new sign installation.

Their final day was August 26th. Both YCC'ers worked hard, showed great interest in the refuge and were much appreciated by all the staff members at Benton Lake. We hope we will be as fortunate in the future with our selection of YCC enrollees.

4. Volunteer Programs

Volunteer Ivan Yocum assisted with the duck nesting surveys on three days. Ivan is a Master's Degree student in Outdoor Education with the Audubon Institute. Outdoor writers Craig and Liz Larcom also provided assistance with these surveys.

Ernie Mills, director of Manpower and Welfare Resources, Malmstrom AFB, was again contacted about supplying volunteers for duck banding. Dennis Leazott assisted twice with banding and botulism surveillance, as did Dale DuBois who volunteered one morning for botulism detail.

5. Funding

Fiscal year 1988 program costs were kept within the budgeted allotment. The largest single item in our budget, other than salaries, is the cost of pumping water from our pumping station at Power, Montana, to the refuge.

Due to an extremely dry winter and spring, our pumping costs increased this year with 17.1% of our O & M budget going for pumping. Other large expenditures included the office remodeling project, signing and setting up the auto tour route and fee area, purchase of concrete arch pipe for Lake Creek repairs and gravel purchase.

The first year's operation of the fee area proved to be a costly one for Benton Lake. Costs to set up the program included: pipe safe - $694.54 (including freight), signs- $820.00, envelope dispenser - $192.50, informational inserts - $158.00, collection envelopes - $196.92, labor and materials to install pipe safe and envelope dispenser- $135.14 and estimated administrative costs - $150.00. Expenses totalled $2,347.10 - we collected a total of $252.50 with the refuge's share being $60.75. We estimate that at that rate it will take nearly 13 years to recoup our initial investment not counting administrative costs.

Although the refuge was designated a fee area in January, the program did not become operational until August first due to the off-again, on-again program and the delay in receiving the necessary materials to set up the collection process. The program was terminated on September 30. We plan in the future to begin collecting fees as soon as the tour route opens.

Table III provides a summary of funding for the past five years.

FUNDING SUMMARY

FY	1210/ 1260	1240	1220/ Rehab	Qtrs Maint.	YCC	TOTAL
88	400,000a			8,400	3,000	411,400
87	347,000b			8,780	3,000	358,700
86	355,700c			5,500	3,000	368,200
85	325,000d			3,000	3,000	331,000
84	275,000e		59,400f	3,100	3,000	337,000

a Includes Large Maintenance funds of $70,000 and Resource Problem funds of $30,000
b Includes ARMM funds of $42,000 and Resource Problem funds of $40,000
c Includes ARMM funds of $121,000 and Resource Problem funds of $40,000
d Includes ARMM funds of $90,000 and Threats & Conflicts funds of $40,000
e Includes ARMM funds of $70,000
f Engineering job order carryover from FY 83

6. Safety

Safety meetings were held as needed or as information of importance was received from the Regional Safety Officer. All new employees read and signed the Station Safety Plan.

Two injury accidents occurred this year. Manager Bob Pearson injured his finger, requiring medical attention and three stitches, when the spring loaded latch on a refuge gate snapped into position. Maintenance Worker Patrick Nies needed first aid treatment after a light fixture fell on his forehead while he was trying to attach it to the ceiling.

All fire extinguishers were checked and serviced by A&M Fire Safety Supply. Additional eye protection/goggles were purchased and given to employees.

Work on the office remodeling project was halted when it was discovered that asbestos transite boards in the ceiling would need to be replaced. Safety Officer Mike Martinez was informed of the operation.

Northwest Foams Inc. of Great Falls was contracted to remove the asbestos from the ceiling of three bays in the refuge office building. The company moved in with the proper gear which included negative air chamber and on-site showers with

appropriate filters. They also took care of the proper permits for hazardous materials disposal. A final air quality test was conducted before we moved back in to the stalls to finish the office remodeling project.

We received news from the State Health lab that a sample of pipe wrap taken from the office basement did not contain asbestos. The trailer house was also tested for formaldehyde and no significant levels were found.

Following a field trip to Stump Lake in North Dakota Manager Pearson had to be treated for poison ivy.

The question of human health, from exposure to selenium, was raised when it was found that Manager Pearson had elevated levels of selenium in his blood. Refuge staff members were tested for selenium levels in December.

The movie "Signals: Read Them or Weep" was shown at one monthly safety meeting. This movie depicted the importance of reading the manuals and being aware of proper maintenance practices before using equipment. Anther topic discussed included fire shelter deployment and the recall of Cecile Industries shelters because of cracking and holes along seams.

Subcontractors set up to remove asbestos ceiling from vehicle bays on office/service building. Special licensing, equipment, handling and disposal procedures were required.
88p-2-8 RLP

The contractor sealed off the building with plastic sheeting and activated a negative air system with special filters. Note plastic "hallway" from building into truck (portable showers) and the large exhaust tube out of the building.
88p-2-10 RLP

7. Technical Assistance

A response was sent to Paul Hartmann expressing our concerns with the proposed grassland easement and suggesting changes for use with the Joint Ventures program.

Information on aquatic vegetation was provided to teachers at North Junior High in Great Falls.

Refuge personnel provided advice to private landowners regarding wildlife developments and supported the effort to modify Farm Bill generated programs through seed mixtures, recommendations and wildlife extension agreements for development of wetlands.

Following computer training at the Great Falls VoTech, staff members helped advise other field stations and the refuge assistant from Bowdoin NWR received one week of training at this field station on MS-DOS, WordPerfect, dBase and Compuserve.

8. Other

In March Pat Johnson, and Elliot Sutta, Budget and Administration, and Maurice Wright, Interpretation and Coop

Association, Regional Office, spent a day at the refuge explaining the fee collection process to the administrative staff.

Associate Manager Barney Schranck visited the refuge on November 28th and 29th to discuss refuge programs, personnel, budget items and inspect the newly remodeled office.

F. HABITAT MANAGEMENT

1. General

Artificial Nesting Structures

Large square bales were first tried here for goose nesting structures in 1987. This one held together fine and was used for loafing on - but no nest.
88-8-37 RLP

Only four of 12 large square bales placed in Unit III last year survived the wind and weather. We placed 20 of these large bales in marsh units last year and were disappointed with the poor results as over half of them were completely gone in the first year. We placed ten more of these "free" bales this year (01/88) and decided to try a different source. Drought conditions in the area drove hay and straw prices out of reach. This fall we contracted for the swathing and baling of some of our poorer DNC strips.

Eight of 12 "square" bales placed in Unit III were completely gone in 6 months after placing. Nearly half of those placed in Unit I and II were also gone or badly fallen apart within the first full year.
88-8-36 RLP

An active Canada goose nest on this square bale in early May was lost before the follow up nest check in late May.
88-8-34 RLP

In December smooth brome round bales from DNC unit 2 were wrapped with snow fence. Three were transported to Schrammeck Lake WPA, 76 were placed in storage at the refuge and 57 were placed on or adjacent to the marsh units awaiting safer ice conditions for final placement.

Data collected on islands and structures over the last several years awaits computer entry and analysis. Loss of seasonal employees due to budget cuts prevented data presentation in this report.

2. Wetlands

Weather Conditions

In a word - drought. Milder than usual winter conditions and warm dry winds much of the year aggravated wetland habitat conditions. Winter ice conditions held until February 21 when some open water was noted along the shoreline of Units V and VI. Colder weather on March 10th caused the marshes to close over again briefly. Warm dry conditions prevailed and the last ice was gone on March 20th. The winter provided no snowpack and spring rains only helped recharge the soil somewhat but produced no measurable runoff into refuge marshes. A shortfall in carry over (stored) water from 1987, coupled with continuing drought conditions in 1988 resulted in reduced waterfowl production at Benton Lake in 1988.

Aerial of the upper marsh units in late June. Unit IVa, top center, is dry and Unit III is holding water in about 68% of the basin.
88-12-22 06/27/88 KD

The ugly yellow green algae mats developed early this spring and reduced overall production of sago pondweed and other beneficial submerged aquatics in Units II, V and VI.
88-10-29 05/15/88 RLP

The No. 2 pump at Muddy Creek was replaced with a smaller 200 hp unit in April. The oil system to the shaft and bushings was non-functional most of the first month of operation due to incorrect assembly at the factory. The unit has been sent back to the factory for inspection and repairs or replacement.
83-21-18 SF

In the fall a hard winter storm hit and froze all units closed on October 27th without any preliminary warning. Warmer weather and winds helped waterfowl expand their roost holes the same week. The hard and 'soft" water battled back and forth for two weeks, then on November 19th old man winter slammed the door until next spring.

Pumping operations were incapable of replenishing the marshes for spring migration and it was late May to early June before marsh units were anywhere close to target management levels. Pumping operations were reduced during mid summer to conserve budget dollars for fall refilling. This was an effort to provide for migrants, waterfowl hunting and hopefully regain stored waters for winter carry-over into 1989. All three pumps were utilized in August and September to the extent provided by available water at the pumping station. Fall pumping was terminated prematurely on September 18th by a snow/ice storm that took down power lines. After a two week delay, power was restored. Weather and water conditions then caused us to postpone further pumping until the spring of 1989.

Water from Unit II was used early in the season to help maintain optimum habitat conditions in Unit IVb. The inter-unit pump system was used to transfer stale water from Unit V low basin and borrow areas into IVc.

Crane truck used by Engineering Equipment Operator Marko to place pump in Unit V pumpsite for dewatering operations in August. Note "undisturbed" duck brood nearby.
88p-2-19 RLP

An evaluation of average surface acres for the units provides a means of estimating expected water consumption. This is based on long term average evaporation rates for this area of 2.5 feet for the April to October period. An annual water budget worksheet was developed and showed the correlation between this theoretical consumption rate (5979 acre feet) and the apparent rate as measured in the individual units (7944 acre feet). The large disparity of nearly 2000 acre feet is a measure of the drought conditions (lack of rainfall) and warm windy weather, thus effecting the evaporation rate and causing frustration in trying to gain ground on stored water carryover. A more detailed record of water management records can be found in the station monthly activity reports and the 1988 Water Use Report.

4. Croplands

A little over half of DNC field II (56 acres) was custom hayed to remove excess standing brome grass. These strips are very subject to being flattened by snow cover and were some of the first "DNC" plantings in the early 1970's. We plan a spring burn, tillage and replanting to tall wheatgrass.

9. Fire Management

An annual burn plan was submitted to allow for ditch burning along Lake Creek. The presence of fuels, mostly set-aside and CRP lands, along the ditch coupled with safety problems with the old weed burner, resulted in the halting of the ditch burning operation. The heavy weed loads in the ditch were cleared using pitchforks and backhoe.

This was the year of wild fires - summer skies were "darkened" by major forest fires. Local air quality suffered from smoke and ash for weeks at a time. As many as three major fires could be seen from the refuge on distant forests at one time. Sullivan, Pabian and Dirks ran the mile and a half to qualify for their redcards in case they were called to fight one of the many forest fires burning in the area this summer. No wildfires occurred on the refuge. The closest we got to these was during the project leaders meeting at West Yellowstone.

10. Pest Control

A pesticide use proposal for a reduced spraying program (at Muddy Creek only) was prepared and submitted. This year we contracted with the Teton County Weed Board to have them spray several spotted knapweed patches on the Muddy Creek property. Refuge personnel were not involved in chemical spraying this year.

Seven acres of knapweed were sprayed with 2,4-D; Banvel was not approved for use and was therefore left out from the county's usual formulation. YCC's were later used to pull knapweed along the banks of Muddy Creek where spraying was not allowed. Several knapweed plants were also hand-pulled in the refuge along the Bootlegger Trail. The public parking areas on the refuge were checked for knapweed, but none was found.

A letter regarding our concern about the spread of Purple loosestrife was sent to the county weed board. Background information on this species was requested from several sources and was shared with Cascade County officials. It was designated a noxious weed on 03/21/89 by the county.

For animal control operations see Section G.15 (page 53).

11. Water Rights

On September 6th Assistant Manager Gary Sullivan received a phone call from an irate farmer who owns land crossed by our pipeline. Mr. James Smelser threatened to take water directly from our pipeline in order to water his cattle. He also threatened to be uncooperative with any access to our right-of-way and that he would be contacting the Congressional delegation. After some discussions with Manager Pearson, who was in Arizona on vacation, and telephone calls with the Regional Office, the refuge took the position that we could not set a precedent and allow Mr. Smelser water directly from the pipeline or ditch. Detailed use of water rights is recorded in the station's Annual Water Use Report.

12. Wilderness and Special Areas

The Mullan Trail Historic Site on the refuge was identified by a sign along the re-established auto tour route and the leaflet provides background information for the visitor. There was no management activity on the adjacent Research Natural Area but two families of burrowing owls, badgers and ground squirrels added to the wildlife viewing for many visitors.

G. **WILDLIFE**

1. Wildlife Diversity

Marsh, prairie and DNC habitats on the refuge combine to provide a wildlife diversity in striking contrast to the surrounding lands ravaged by strip-crop agriculture. The high productivity of shallow refuge marshes provides a habitat for high species diversity as well as density.

Steel wool? No, but probably meadow vole wool. This large raptor pellet was found on the large DU island in Unit IVb. The egg is the first "runt" Canada goose egg that RM Pearson remembers seeing in his career.
88-6-31 RLP

2. Endangered and Threatened Species

Spring Migration

Peregrine falcon were identified and recorded on the refuge on March 24 (1 adult) and April 11 (1 adult) by seasonal bio aids. Each time the bird was perched on a fence post. No other confirmed records were made on this species during 1988.

Bald eagles used the refuge during March and April as they migrated through with the waterfowl. Only single birds were seen, with adults reported on 03/09, 03/27 and 04/02 and immatures seen on 03/04 and 04/29. A bald eagle (age not specified) was also reported on March 28.

Fall Migration

Bald eagles were first noted on October 8 and last seen on November 25. Adults were recorded on 11/13 (2), 11/19 (2) and 11/25 and immatures were record on 10/08 (1), 10/26 (5), 11/13 (3), 11/19 (1) and 11/25 (1). The most seen on any day was five on 10/26 and 11/13. Bald eagles were frequently seen near the roost holes on Units I and II where

waterfowl were concentrated. Two bald eagles were still present on November 25.

Threatened species occurring regularly on the refuge and with the number of records for 1988 in parenthesis: the prairie falcon (4), ferruginous hawk (2), burrowing owl (7+) and white-faced ibis (5+). The burrowing owl and white-faced ibis were documented as nesting here this year.

A data base file of all refuge bird observation records lists only three records for the piping plover and seven for the merlin. Neither were recorded here in 1988.

The state list of endangered species includes: black-footed ferret, grey wolf, peregrine falcon and the whooping crane.

Data collected on falcons and bald eagles are recorded on BLM Raptor Observation Cards and are submitted to the Montana Bald Eagle Work Group in Helena, Montana.

3. Waterfowl

Swans

Tundra swans (50) arrived on March 4th and peaked at 7,000 by end of month. Most swan use occurred in Unit III; but good numbers in Unit II provided tour route visitors with easy viewing.

Tundra swan peak numbers set new records (both spring and fall) at Benton Lake this year with 7000 seen on March 30 and 7360 seen on November 1.
88-20-165 10/31/88 KD

Birder Mike Schwitters reported seeing collared swans U-173 and U-174 at Freezeout GMA. We reported the collars to Mike Spindler Selawik NWR, Alaska, who is studying the swans migration routes, stopovers, and wintering areas. The swans were banded in summer of 1987 near Selawik, Alaska, as a breeding pair with five cygnets. The same pair was seen on three occasions in January in the Chico, California area. Evidently, Selawik swans migrate across the Rockies and northward along the eastern front of the Rocky Mountains. We observed one collared swan last fall but were unable to read the number.

Two swans and one snow goose were found dead in March. Examination of the swan gizzards revealed some dark discoloration, but no lead pellets or fragments were found. These swan carcasses will be used at Patuxent as artificial whooping crane images in their propagation program.

Tundra swan began arriving at the refuge during the first part of October. As many as 7000 swans were using the refuge by the end of the month. Swan numbers remained relatively high during the first part of November, peaking at over 7360 on the 1st. Five hundred thirty-seven swans remained on November 15th. Most swan use occurred on Units I and II. Two swans were last seen on 11/25, and one may have been a cripple.

White Geese

Snow geese first appeared this spring on March 21st and reached 12,000 by end of month. An inspection of the flock revealed three black neck collars, but we again had difficulty reading band numbers. Winter sightings of collared snow geese came from Utah, Nevada, Colorado and Texas.

The only banded western Canadian arctic snow geese reported last fall from Montana came from the eight collars we observed here late in the migration period.

Snow geese peaked on April 6th at 15,000. Several black collars were observed and reported to Dr. Kerbes, Canadian FWS and leader of the international snow goose neckbanding project.

Snow geese began arriving this fall at the refuge early in October and 8940 were present by the end of the month.

Snow goose numbers were down to 7800 on November 1st, and only 407 were still on the refuge on the 15th. Two snow geese with black-colored neck bands were observed by Bio Aid DuBois on the 2nd. Manager Pearson observed four blue phase snow geese on the 4th. Some 1200 snow geese were using the refuge on November 25.

Canada Geese

In late January Manager Pearson spotted one pair and a group of 3 Canada geese, as well as a flock of thirty, scouting out the refuge. Warm temperatures in late February resulted in the early observation of a pair of geese on a culvert nest structure on the 25th.

Canada goose production was reduced from last year. Goose nesting was effected directly by low water conditions. Nests in the "dry" water units experienced heavy predation by coyotes. Out of 80 goose nests found, only 30 were recorded as successful.

Canada goose numbers peaked at 2510 birds on November 19 and remained near 1100 until freeze-up occurred. Six hundred fifty were counted browsing in IVc on November 25. About 100 were present at the end of November.

Since 1981 the refuge and surrounding area has been closed to Canada goose hunting during October. This has allowed protection of the resident flock until the production objective level of 450-500 goslings per year is met.

Ducks

Spring Migration

Drought conditions with early warm mild weather combined to depress spring peak concentrations at the refuge. A thousand mallards were using the refuge in late January along with a few Canada geese due to the mild weather. By the end of February, migration had begun with several thousand pintail here on "Sadie Hawkins" day. By mid March ducks had increased to 20,000. A (dismal) peak of 30,000 ducks occurred on March 28. As units dried out, waterfowl departed the refuge. One Eurasian wigeon was observed with the spring migrants.

Duck Production

An estimate of the annual waterfowl production on the refuge was obtained by sampling refuge nesting habitats to determine nesting densities and nesting success. Sampling procedures followed those described by Klett et al. (1986). Sample plots were set up in DNC (7 plots), native grassland (6), shoreline (4), dike (4), and alkali bulrush (1) habitats. Complete coverage of islands and structures in three units was attempted. DNC and native grassland sample plots were dragged with a 200 ft cable/chain pulled by vehicles. Dikes and shorelines were dragged with a 50 ft cable/chain pulled by ATV's. Other habitats were sampled on foot. Three nest searches were completed: 4/28-5/3, 5/17-6/2, and 6/6-6/22. Nest success rates for each habitat were

calculated using the Mayfield 40% method as described in Klett et al. (1986). The stratified Mayfield estimator was used in calculating the nest success rate for the seven DNC fields. This allowed all seven DNC fields to be treated as one habitat type, as described in Klett and Johnson (1982). Data were recorded on standard USFWS nest cards in the field, then entered in a dBASE III PLUS database from which queries could be made to summarize information. Mayfield calculations were accomplished with spreadsheets in Lotus 123.

Upland duck nesting habitat sample plots were again surveyed this year. Nesting densities declined as expected, but Mayfield nesting success rates again held near 72% for a third year in a row due to an active predator control program.
88-10-3 RLP

A total of 438 nests were found in the three searches, down 33.8% from the 1987 total (652 nests). Of these, 369 were normal nests used for nesting success calculations. The nests not used in the calculations included non-normal nests (41), nests which failed due to investigator disturbance (7), nests where the fate was unknown (15), and nests located outside the sample plots (6).

Mayfield 40% success rates and duck production are summarized for each habitat in Table 1. Mayfield 40% success rate for all sample plots combined was 72.1% and

varied from 49.2% in native grasslands to 100% on the Circle Dike. Duck production for upland habitats on the refuge was estimated at 7205 ducks. Production for each habitat was obtained by calculating Mayfield 40% success rates and expanded nest density. The expanded nest density is an estimate of the total number of nest initiations per acre which corrects for the nests that were initiated and destroyed between searches. The production figure of 7205 ducks produced is for sampled habitats only, and does not include over-water nests of species such as ruddy duck, canvasback, redhead, and scaup (and to some extent, mallard).

Pintail nest hatching in the weed patch on a low profile island in Unit V.
88-10-38 RLP

Table IV shows 1988 duck production estimates based on nest success and densities.

TABLE IV

1988 DUCK PRODUCTION BASED
ON NEST SUCCESS AND DENSITIES

	DNC	Grassland	Shoreline	Dikes	Alkali Bulrush	IV-C Islands	Circle Dike	DU Islands	Misc Islands	Combined
Total Acreage	619	5873	778	54	2	1.5	3	7.6	1	7339
Acres Sampled	96.5	300	48	23.3	2	1.5	3	7.6	1	482.9
Nests Found	143	16	48	56	9	7	15	24	51	369
Successful Nests	112	11	40	53	9	6	15	21	45	312
Mayfield Success Rate	76.6	49.2	65.3	90.3	100	73.7	100	79.8	78.1	72.1
Nests Initiated in Sample	176	22	61	59	9	8	15	26	57	434
Nests Initiated in Entire Habitat	938	437	992	136	9	8	15	26	57	2809
Number Successful Nests	718	215	648	123	9	6	15	21	45	1800
Number Successful Broods	531	159	480	91	7	4	11	16	33	1332
Estimated Hatch/ Production - 5.41 ducks/ Successful Nest	2874	861	2594	492	36	24	60	84	176	7,205

We calculated the constant 5.41 for fledged brood size based on a refuge weighted average for all species using brood size data from NPWRC and Pospahala etal (1974). Table V lists the estimated brood size at fledging, percent species composition, and the weighted values which were added together to calculate the 5.41 brood size value.

TABLE V

AVERAGE FLEDGED DUCK BROOD SIZE

Species	Brood Size (Pospahala)	Success. Nests	Relative Percent	Weighted Number
Mallard	4.90	52	.165	.8085
Gadwall	5.78	115	.364	2.1039
GW Teal	5.93	3	.009	.0534
BW Teal	5.93	36	.114	.6760
Shoveler	5.78	33	.104	.6011
Wigeon	6.00	4	.013	.0780
Pintail	4.12	50	.158	.6510
L. Scaup	6.00	22	.070	.4200
Redhead	6.00	1	.003	.0180
TOTALS		316	1.000	5.41

Total refuge duck production by species is summarized in Table VI. These figures were obtained by multiplying the 7205 estimate by each species' relative percent composition of successful nests for upland nesters. Over-water nesters (scaup and redhead) were multiplied by a factor of two to account for nests not covered by the sampling. Ruddy duck and canvasback production were by best guess. Mallard production was not factored to account for the over-water nesting, so mallards were probably underestimated. Overall production declined 58.7 percent from 1987 levels, with pintail, shoveler, redhead and wigeon showing the largest declines.

TABLE VI

1988 ESTIMATED DUCK PRODUCTION

SPECIES	Successful Nests Number	Percent	1988 Production	1987 Production	Percent Change
Mallard	52	16.5	1,189	1,803	-34.1
Gadwall	115	36.4	2,623	4,428	-40.8
Green-wing Teal	3	0.9	65	36	+80.6
Blue-wing/Cin. Teal	36	11.4	821	1,839	-55.4
Northern Shoveler	33	10.4	749	2,768	-72.9
American Wigeon	4	1.3	94	571	-83.6
Northern Pintail	50	15.8	1,138	5,874	-80.6
Lesser Scaup (upland)	22	7.0	504	393	+28.2
Lesser Scaup (overwater)			504	393	
Redhead (upland)	1	0.3	22	143	-84.6
Redhead (overwater)			22	143	
Canvasback			15	30	-50.0
Ruddy Duck			200	820	-75.6
Totals	316	100.0	7,946	19,241	-58.7

In past refuge reports, waterfowl production has been reported as the number of ducklings hatched as calculated from nesting success and density data derived from nest surveys. This number was simply the number of successful nests (extrapolated for the entire refuge) times a constant hatch rate of 6 ducklings per nest. The total also included a correction factor and total estimate for over-water nesters not adequately sampled by the nesting study. To better reflect actual recruitment and to standardize with other refuges, waterfowl production in 1987 and 1988 has been calculated to estimate the number of young birds fledged to flight stage. This production estimate was calculated by multiplying the number of successful nests (ie. number of broods) by a brood survival rate of 74%, multiplied by a calculated constant for ducklings to flight stage per brood. The 74% brood survival rate was based on mallard data from Northern Prairie Wildlife Research Center and is currently being used on the Four Square Mile Production Study (Cowardin 1987). Orthmeyer (1986) conducted a study of mallards on Benton Lake NWR which also indicated a high rate (37%) of total brood loss. His data is thought to be elevated due to excessive field disturbance caused by research activity.

Table VII compares production estimates using the hatch rate of 6 ducklings per nest versus using a brood survival rate of 74% and calculated fledging rates based on a weighted average as calculated in Table V. Note that the estimates

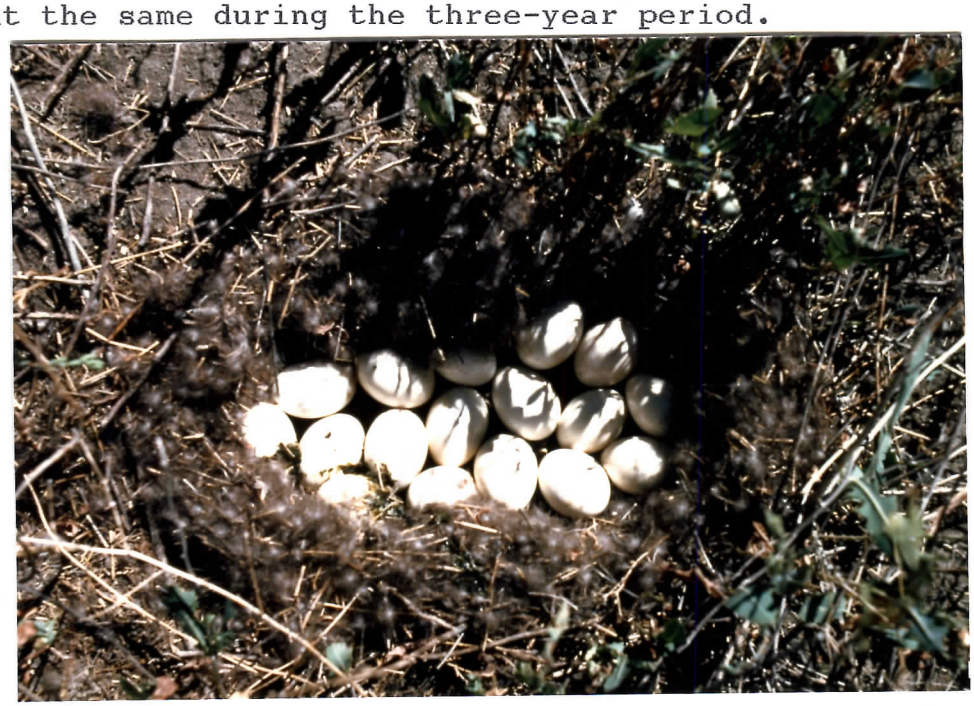
nesters. The figures point out the importance of specifying how production is estimated.

TABLE VII

DUCK PRODUCTION - NUMBER HATCHED
VERSUS NUMBER FLEDGED

Year	Total Nests Found	Normal Nests Found	Mayfield Success Rate	Total Success. Nests	Number Hatched (6/Nest)	Number Fledged Per Nest	Total Number Fledged
1986	748	669	72.6%	6,311	37,886	5.38	25,125
1987	652	598	74.4%	4,667	28,002	5.17	17,857
1988	438	369	72.1%	1,800	10,800	5.41	7,205

Table VII also points out the dramatic drop in duck production at Benton Lake, due to prolonged drought. The drop in production was the result of low nesting densities of ducks, since the Mayfield nesting success rates remained about the same during the three-year period.



Duck nesting densities are high at Benton Lake, but this is ridiculous! Two gadwalls were found incubating side by side. Nest #373 with 17 eggs 14 hatched.
88-20-090 06/30/88 KD

Unusual observations during the duck nesting study included a gadwall and shoveler nest that were only 1 foot apart, in

DNC 6, and two gadwall hens that shared the same "double" nest bowl. The hens where sitting shoulder-to-shoulder on the nest when flushed. The nest contained 17 eggs at the same incubation stage, of which all but 3 hatched. Just think of the potential for gadwall nesting densities!

Five white-winged scoters were observed in August.

Fall Migration

Duck numbers remained low into October.

In November duck numbers remained relatively low, peaking at 13,000 on the 1st, and only 3200 remaining on the 15th with freeze up occurring on the 19th. Mallard and American wigeon provided the bulk of the count. After that common goldeneye and mallard predominated with a dozen cripples of other species. Total duck numbers were in the low hundreds during the rest of the month.

4. Marsh and Water Birds

Most of the information in the following two sections was collected in conjunction with the goose nesting surveys, duck nesting studies, and contaminant studies.

A new peak number of 44 white-faced glossy ibis were observed feeding in Unit IVb and several nests were found near the black-crowned night heron nesting colony and more appeared to be nesting in with the Franklin gull colonies.
88-20-036 KD

protection from wave action. Western grebes and pied billed grebes were observed, but no nests were found. At least three broods of pied-billed grebe were observed. American bitterns were observed during the summer and probably nested, but no nests or young were observed.

The large abundant fresh water "shrimp" are thought to be one of the staple food items in the diets of eared grebe. Recent studies show that eared grebe tend to accumulate selenium more so than most of the other marsh birds examined.
88-20-155 09/13/99 RLP

ARM Linehan conducted a late night rail survey with the help of Bio Aid DuBois and added positive proof of the presence of the Virginia rail. This survey got several immediate vocal responses at several different locations in the marsh.
88-20-96 6/30/88 KD

A night survey was conducted to determine an index to the number and species of rails nesting on the refuge. Recorded tapes of Virginia and sora rails were played at 10 locations around the refuge. 36 sora and 6 virginia rails were counted. A Virginia rail was later observed at close range (20 feet) through 8 power binoculars by Bio-aid Kristi DuBois. It walked into a 1 1/2 foot wide fringe of alkali bulrush along the canal in Unit IV-C. These elusive birds have probably nested at Benton Lake for years, but escaped detection by being secretive, nocturnal, and found mainly in the areas of the refuge closed to the public.

Two sandhill cranes were observed in September as they paused briefly during fall migration.

5. Shorebirds, Gulls, Terns and Allied Species

Franklin's gulls nested in two colonies, one large colony in Unit I and a small one in Unit VI. An aerial flight was conducted in late June to photograph the main colony in Unit I to delineate colony size and hopefully count the nests. The nests were not distinguishable in the photographs, but dense nesting concentrations could be delineated by the appearance of the cattail habitat. By late June, the cattails in the nesting colony were over a person's head, making plot sampling nearly impossible. Sampling had not been done earlier to avoid disturbing both the gulls and the white-faced ibises nesting in with them. Nesting colonies in dense cattail areas could probably be successfully surveyed by conducting the aerial photography in late May or early June, before the annual growth of cattails has occurred. A nest count for Franklin's gulls was estimated by mapping and measuring the area of the high nest density and low nest density areas from the aerial photos, then estimating the nest density based on visual inspection of the colony from the airboat. The total number of nests was estimated to be 10,200 nests in Unit I and 250 nests in Unit VI. Some mortality of nesting Franklin's gulls was observed, and 6 gulls were found dead, sitting on eggs on May 26. The cause of death was unknown, and the carcasses were too deteriorated to send in for necropsy. Production of gulls appeared to be excellent.

California gulls attempted to set up nesting colonies on islands in Units IV-B and on VI. Sixty-three nests were destroyed in Unit IV-B, in accordance with the gull control plan to limit gull depredation on duck eggs and ducklings. The small California gull colony in Unit VI was left undisturbed, and successfully raised young. Ring-billed gulls were observed, but no nests were confirmed. A migrating flock of 5,000 Bonaparte's gulls was observed during August (new refuge record).

Common tern nest hatching. They appear to prefer a little more cover than the avocet. Weed or grass cover didn't matter, several of the islands in Unit V were colonized by this species this year.
88-10-21 RLP

Common tern chicks a few days old on a low profile island in Unit V.
88-10-19 RLP

The majority of the common tern nesting took place in Unit V, where 49 nests were found on islands, and 15-20 nests were located in a small colony on mud flats near the boat ramp. The total nesting population of common terns was estimated to be about 75 nesting pairs. About 15-20 black terns roosted in Unit IVb, but no nests were found.

An estimated 25 pairs of black-necked stilts nested in Units III, IVb, V, and VI. Eighty American avocet nests were found on islands in Units V and VI during waterfowl nesting surveys.

This little fellow was just emerging when that terrible noisy airboat arrived and scared two adult black necked stilts off the island. This was the first island nesting we'd observed by this species at Benton Lake - Unit V.
88-10-13 RLP

Shorebird nests found during the nesting studies included: upland sandpiper (5), marbled godwit (10), willet (10), killdeer (1) and Wilson's phalarope (5).

Low water levels in some units during Late July and August resulted in heavy use of the refuge by large flocks of migrating shorebirds. Flocks of 500 to 1000 long-billed dowitchers were common in Units V and VI. Other shorebird species included the greater yellowlegs, lesser yellowlegs, black-bellied plover, pectoral sandpiper, spotted sandpiper, red-necked phalarope, and numerous unidentified peeps.

The diminutive Wilson's phalarope seems to prefer short grass sites on the islands in V.
88-10-25 RLP

A macro lens does help! Killdeer nest abundantly along gravel roadways, dikes and on the islands, and prefer little to scanty cover.
88-20-005 05/04/88 KD

The flashy vocalist nests in our native upland short grass prairie - avoiding heavy cover sites. Willets seem to prefer club moss and blue gramma areas.
88-20-010 05/18/88 KD

6. Raptors

One northern harrier nest with 6 eggs was found during nest searches on the alkali bulrush plot in Unit IVc. The nest failed, possibly due to being disturbed during incubation. Three Swainson's hawk nests were located in refuge shelterbelts. One short-eared owl nest was found during the nesting surveys, a large contrast from the 8 nests found last year, indicating a possible decline in nesting populations. At least 4 pairs of burrowing owls nested this year.

Non-nesting raptors observed on the refuge included the bald eagle, golden eagle, rough-legged hawk, ferruginous hawk, osprey, peregrine falcon, gyrfalcon, prairie falcon, American kestrel, red-tailed hawk, and snowy owl. The osprey was seen on two occasions flying over our marsh units on May 16th and June 30th. This appears to be only the second and third records of this bird at Benton Lake. Their hunting trips were unsuccessful here due to lack of fish more than 2 inches long.

Adult and fledged young great horned owls were commonly observed, but it was not known whether they nested on the refuge or nearby on private land. A cat-lover in Great Falls whose cat had allegedly become dinner for a great horned owl stirred up a controversy by accusing the refuge of harboring too many owls. Assistant Manager Linehan pointed out in newspaper and TV interviews that plenty of owls nest right in Great Falls, and that the refuge was not necessarily the source of the population. A flurry of pro and con letters to the editor followed, with someone finally pointing out that a true cat lover should keep their kittys inside to prevent death from owls, cars, and all the other many dangers a loose pet can face, not to mention preventing the cats from eating so many songbirds!

When are you guys going to get some trees in this place? The food is fine, but the rooms are lousy!
88-20-154 09/06/88 KD

An injured great horn owl was observed by waterfowl hunters and captured by Bio Tech Pabian. The owl was taken to a local raptor rehabilitator. It had been shot with steel shot, but its injuries were not serious. The owl later recovered and was released by Jeff McPartlin.

Large migrating flocks of Swainson's hawks were observed on and near the refuge during August and September. One flock of about 150 birds was sighted in a wheat stubble field during a storm.

of about 150 birds was sighted in a wheat stubble field during a storm.

An injured saw-whet owl was referred to falconer Jeff McPartlin in Great Falls. A snowy owl was observed along the entrance road on December 11 and 12.

7. Other Migratory Birds

The Shonkin Creek and Oilmont Routes of the Annual Mourning Dove Survey were run on June 1. On the Shonkin route, 10 doves were heard cooing (60 calls) and a total of 15 doves were seen. A single dove was seen on the Oilmont route.

Lark buntings were here in force and nested in large numbers this year. Other unusual bird sightings for the refuge included bobolink, golden-crowned kinglet, downy woodpecker, and a Sprague's pipit singing over DNC 1.

In preparation for an update of the refuge bird list, Bio Aid Kristi DuBois developed a data base of over 4000 bird observational records dating back to before the refuge was first manned. A draft bird list was compiled containing 206 species, 65 of which have been documented as nesting on the refuge.

8. Game Mammals

White-tailed and mule deer use on the refuge has remained stable in recent years. Whitetails were observed mostly in the cattails in Units II and III while the mule deer were frequently seen on the eastern end of the refuge. Both species of deer reproduce on the refuge, but move to the breaks of the Missouri River in winter.

We noted an increased use of the refuge this year by pronghorn, with reproduction occurring on the refuge for the first time in several years.

10. Other Resident Wildlife

After several unsuccessful searches for a refuge sharp-tailed grouse lek in recent years, Biological Aid Clarke Dirks discovered a grouse dancing ground only a short distance from the tour route. Grouse numbers have been increasing on the refuge in recent years but this is the first recorded lek for the refuge and one nest was found during the waterfowl nesting survey.

This is the first nesting record for the sharp-tail grouse at Benton Lake. It was found in DNC field No. 1.
88-20-043 05/27/88 KD

The pheasant crow count averaged 1.3 crows per station which is an increase from last year, but down from a high of 3.9 in 1983.

TABLE VIII

PHEASANT CROW COUNTS

Year	Average Calls Per Station
1988	1.3
1987	0.7
1986	0.4
1985	3.0
1984	2.5
1983	3.9

- -

At year's end upland game birds appeared to be in good condition and not under much stress.

15. Animal Control

The control program for California gulls consists of general harassment by shooting and disturbing nests during the early part of the year in order to displace the gulls from refuge islands. The refuge is seeking to keep the gull colony at about 50 nests per year. About three staff days were expended for gull control on five different days form April 14 through May 23. This effort eliminated a total of 117 California gulls and 2 ring-billed gulls by shooting, and destroyed 63 nests with eggs from islands in Unit IVb and V.

Refuge force account trapping of skunk and raccoon on the refuge was again conducted between March 1 and July 15. Prior to the trapping season, additional live traps (16) and supplies were purchased. A maximum of 46 conibears (220's) and 28 live traps were set out at one time. Traps were set in all habitat types of the refuge including islands. Emphasis was placed on the east refuge boundary early in the season as a result of increased predator activity observed there in 1987. Live traps were used along the tour route. We again used trout obtained from the State hatchery at Giant Springs as our principal bait. Commercial fish oil and several jars of special scents and baits were also used.

An active predator control study from 1985 to 1988 further documented a direct relationship between suppressed populations of ground nest predators (skunk and raccoon) and sustained high nesting success rates in upland nest ducks.
88-11-23 KD

A total of 6,924 trap nights resulted in the removal of 31 skunks and 12 raccoons. This year the majority of skunks (21) were caught long the east boundary during the first month of trapping. The take of raccoon was steady but slow throughout the trapping period. There was a slight increase in staff days expended on the program this year as a result of the re-setting of traps following a spring snowstorm and the increased number of total traps. Total costs for the 1988 season included salaries, operations and supplies ($735 for new traps and baits) totalled $2,527. A breakdown of trapping results by month is given below.

TABLE IX

1988 PREDATOR REMOVAL

Month	Traps Days	Skunks	Raccoons	Misc.
March	1,417	21	1	1
April	1,820	1	2	1
May	1,805	4	5	0
June	1,336	5	3	2
July	546	0	1	2
Sept.			2*	
Oct.		1**		
	6,924	32	14	6

* captured at banding site
** shot on V/VI dike

Recommendations: Emphasis should continue on early trapping in late February and March when skunk are emerging from their dens and food sources are scarce. Commercial fish oil, scents and baits were successful and should be used again. Small traps for mink should be purchased and tunnel/hole sets dug on islands in the fall. Island trapping in general has not been successful and should be re-evaluated and modified. All staff involved in trapping need to be certified in use of the .22 pistol. A euthanasic syringe stick should be considered for skunk removal.

Two additional raccoons were taken in traps placed at duck banding sites in August and September. One skunk was shot in October on the V/VI dike.

16. Marking and Banding

Six Salt Plains duck traps were placed in three locations for a total of 61 trap days. Table X includes the age, sex and species composition of duck trapped and banded. A total of 1126 birds were recaptured. One hundred forty-nine recoveries were made on individuals banded in previous years at Benton Lake or at other locations. Eighty-two birds were lost due to drowning in the traps.

TABLE X

AGE-SEX-SPECIES COMPOSITION

	AHY-M	AHY-F	HY-M	HY-F	TOTAL	%COMP.	%HY
Mallard	726	492	140	66	1424	97.8	14.4
Pintail	17	4	5	4	30	2.0	30.0
Redhead	0	0	1	0	1	---	100.0
Wood Duck	0	1	0	0	1	---	0
Total	743	497	146	70	1456		

The wood duck has been recorded twice before on Benton Lake. This hen was a surprise guest in one of our duck traps in August during our annual mallard banding program.
88-20-152 08/16/88 KD

The wood duck is the first ever banded here and only the third sighting on record. The most interesting bird trapped was a mallard first caught just three weeks after having a reward band attached to it in Medicine Hat, Alberta, Canada. He was captured six times during the 11 day banding period from August 15 to September 9.

Very high duck mortality, (3.1% of birds captured) was the biggest concern with the 1988 banding operations. As all losses occurred in the trap itself, several contributing factors may be suggested. Most importantly was the high number of birds per trap per day. Most mortality occurred during the first week, when actual catches far exceeded the season average. The number of styrofoam floats was increased during the second week, which also reduced mortality. One key factor in reducing mortality is to reduce time in trap. This was accomplished by rebaiting and closing the traps as late in the day as possible. Without additional "experienced" manpower, the banding time could not be reduced considerably. A more intensive prebanding predator removal effort may also help, as only 2 to 3 ducks were lost following the removal of one raccoon during the second week of the trapping season. While there is no physical evidence that a raccoon caused any direct duck mortality, it is feasible to assume that a nearby raccoon might cause undue stress on an already overcrowded trap load of ducks.

17. Disease Prevention and Control

No major disease losses were recorded at Benton Lake NWR during 1988, although losses were higher than in 1987. A total of 597 carcasses were picked up during routine botulism checks conducted from late June through early September, compared to 83 carcasses collected during the same period in 1987. The state-managed Freezeout Lake Wildlife Management Area, located 35 miles to the west, reported losses of around 10,000 birds this year. The only unusual occurrence was the loss of 340 ducklings during July and August. The duckling losses occurred in several water units and involved several duck species (pintail, gadwall, blue-winged teal, mallard), although the species was not determined for most of the duckling carcasses. Heat stress, entanglement in algae mats, separation of lone ducklings from their brood, and botulism were all suspected causes of the mortality, which mainly involved ducklings under 4 weeks old. Twenty-four duckling carcasses were sent in for necropsy; the lab results indicated botulism. Duck production to flight stage was estimated to be over 7,000 ducks during 1988, so the mortality represented a small percentage of the ducklings present on the refuge.

The major contributing management practice responsible for the prevention of a botulism outbreak was probably routine patrols and clean-up of all carcasses. More details can be found in station files on "Botulism" and the 1988 Wildlife Disease Report.

H. PUBLIC USE

1. General

Manager Pearson and Assistant Manager Sullivan visited Senator Melcher's office to discuss the fee area, Farm Bill and other topics. Manager Pearson also presented a program to the Montana FW&P orientation session for volunteers.

Tour route visitor contact station (kiosk) was adapted to accommodate the new fee area operation which began in August, 1988.
88p-2-24 DL

One news release on the sighting of neck-collared swans was prepared for the local Audubon chapter newsletter. ARM Linehan was interviewed by KFBB-Television on two occasions. The first interview dealt with the refuge nest dragging studies and waterfowl production. A second interview concerned owls of the refuge and their impacts on local cats.

In December Pearson gave programs to the Civitan and the Exchange Clubs in Great Falls. Dubois and Pearson participated in the local Christmas Bird Count. A pair of old squaw ducks were seen in the river at Great Falls by Pearson during the count.

2. Outdoor Classrooms - Students

In March Manager Pearson spent a Saturday teaching at the 4H Conservation Camp Workshop. Approximately 150 students attended.

Scout Troop #8 was given a slide program on birds and a refuge tour in April.

Once again May was the popular month for school visits. The Great Falls Schools continued their outdoor education program which sends all 3rd and 7th graders to the refuge for units on wildlife, shelterbelts and aquatic life. Smaller schools and groups in the area also received 'guided' tours and talks by refuge staff. These groups included: Cub Scouts, Lady of Lourdes and an association of home schoolers.

A group of young visitors examine the "Hey Kids" display at our kiosk before going on a guided tour of the marsh.
88-10-10 DL

In September Manager Pearson visited the Fairhaven Hutterite colony and gave a program on birds and the refuge to 20 students and 3 teachers. Linehan gave a talk and tour, assisted by Audubon Chapter President Margaret Adams, to Malmstrom AFB cub scouts.

5. Interpretive Tour Routes

A nine mile tour route loop allows visitors to view refuge uplands and three of six refuge water impoundments. The refuge tour route is open to visitor use during daylight hours only and is closed between December 1 and March 1 of each year.

An estimated 355 cars used the tour route after its opening on March 1. Visitor numbers were boosted by 7th grade Biology class students from North Jr. High who brought their parents out and tried to identify the most bird species.

There were over 1500 refuge visits recorded in April.

In May we received the new auto tour leaflet and the ten interpretive pictorial markers. These were immediately installed to facilitate the use of the new tour route brochures.

6. Interpretive Exhibits/Demonstrations

Manager Pearson assembled a slide selection for use at San Francisco Bay NWR and provided slides for a Montana NWR display being designed in the Regional Office.

8. Hunting

A news release was issued concerning several changes in the waterfowl regulations and how they would effect Benton Lake hunters.

The refuge opened to hunting of "light geese", swans and Hungarian partridge on October 1, and the duck season opened on the following Saturday. Hunting pressure was light and hunter success was fair for ducks despite bluebird weather most of October. The half day hunt on opening weekend was not practiced this year (coordinated with Freezeout WMA).

Hunting pressure continued to be light, but steady, in November until the units froze over on the 19th of November. The refuge hunting program ended on the 30th of November.

TABLE XI

HUNT PROGRAM HISTORY

Year	Units Acres	Open	Visits	Ducks	Geese	Swan	Cost
1966	3776	III,V	1540	1906	9	-	-
1967	3776	III,V	1540	2711	9	-	-
1968	4656	IV,VI	3202	5275	15	-	-
1969	4656	IV,VI	2846	4178	16	-	-
1970	4656	IV,VI	2056	2870	0	-	-
1971	4024	I,II,III	1808	3876	7	-	-
1972	2039	I,II,III	4188	6952	54	-	-
1973	1428	II,III	1930	1984	8	-	-
1974	2224	II,III,IV	3464	5013	36	-	-
1975	3700	II,III,IV	2795	3970	22	-	-
1976	2042	II,IV,V	3516	4635	10	-	-
1977	1461	II,V	2148	2532	98	-	4600
1978	3855	IV,V,VI	2050	9470	50	-	3100
1979	3855	IV,V,VI	1650	3373	10	-	3000
1980	5000	IV,V,VI	2070	3885	9	-	4000
1981	5000	III,IV,VI	1230	2552	15	4	2550
1982	5000	III,IV,VI	1821	2956	47	6	2700
1983	5000	III,V,VI	2097	4097	92	66	4700
1984	7200	III,IV,V,VI	2482	1906	57	29	-
1985	7200	III,IV,V,VI	724	497	50	1	-
1986	7200	III,IV,V,VI	794	1047	0	0	1600
1987	4300	IVC,V,VI	405	842	2	1	2050
1988	4300	IVC,V,VI	699	1116	5	22	1401

TABLE XII

1988 HUNTING SUMMARY

	Cars	Hunter Visits	Bagged Ducks	Ducks/ Hunter	Bagged Geese	Bagged Swan	Pheas/ Huns
Opening Weekend	51	88	220	2.5	0	0	0
Remaining October	248	392	568	1.45	0	0	3/1
November	175	219	328	1.5	5	22	2/0
Totals	474	699	1116	1.6	5	22	5/1

17. Law Enforcement

In April one teenager was issued a warning when Manager Pearson found him with a loaded .22 rifle in his vehicle on the tour route.

An immature Swainson's hawk was shot by unknown individuals along the auto tour route. The hawk was one of several fledged from a nest in the shelterbelt located near headquarters. The young birds and their parents had become quite tame and were enjoyed by many refuge visitors and photographers using the tour route.

Bill Haglan from Charles M. Russell NWR assisted Manager Pearson and Assistant Manager Sullivan with law enforcement on the refuge for the opening of duck season. We were expecting a significant shift in hunting pressure from Freezeout Lake WMA with their going to steel shot this season. Hunter use was much less than expected.

Tighter restrictions on bag limits and shooting hours created few problems on the refuge. Only 2 citations were issued by Manager Pearson. Citations involved were shooting after hours and trespass (archery practice) in a closed area.

Throughout November law enforcement patrols were conducted on the weekends by Manager Pearson and Assistant Manager Sullivan; no cases were made.

I. EQUIPMENT AND FACILITIES

1. New Construction

A maintenance office/crew room was constructed (13' x 15') in the corner of the carpentry shop area (40' x 40') and a storage room built upstairs. The carpentry area is still unfinished and needs a heating system.

A 200 horse power electrical water pump which was purchased by CGS in August, 1987, for $22,946 with a 90 day performance date, was finally delivered and installed in early April, 1988. The contractor has performed very well with the installation and electrical control panel modifications and reactivating the automatic restart systems on the other two (350 hp) pumps. A 'so-called" manufacturer's representative was present for the initial start up inspection but was more hindrance than help. The oil lubrication system was non-functional but he couldn't even detect the problem and was only interested in getting on down the road. The company had mis-assembled the top bushing thus preventing normal oiling of the shaft and

bushings. This was corrected after about one and one-half months operation. The unit was returned to the manufacturer in November, after the pumping season, for a complete inspection for damage. The shaft and bushings were replaced and as of this writing the unit has been reinstalled in our pumping station and again awaits test operating before the final payment will be received by the contractor, Allen Electric of Helena, Montana.

Three metal frame storage racks were built by Marko to facilitate storage of the large pumping units (two inter-unit pumps and one of the large pumps from Muddy Creek).

2. Rehabilitation

The refuge office, built in 1962, was of the old design with three small side offices and a reception area where the clerk work area was located. The mechanic' work bay was located right next door to the clerk's area (by design!). The visitor was barely accommodated with just enough room to get in out of the weather, ask his question, turn around and leave.

The original entrance to the refuge office provided little of anything to accommodate the refuge visitors. Bringing a Scout or school group into the office was a traumatic experience.
88-10-4 RLP

With the establishment of the Wetland Management District in the early 1970's and the stationing of a realty specialist at Benton Lake, our office was crowded. In recent years, computers, copy machines and more volumes of paper have forced the use of the basement storage space as office work area. In 1987 a second assistant manager was added to the staff.

The first vehicle bay next to the office was originally designed for a mechanic's work area, but was never used as such because it was too small and too close to the office.
88-11-24 06/21/88 RLP

This year approval was obtained to utilize a special $25,000 ARMM's fund for remodeling the refuge office, with the basic plans to expand the old office into the first (mechanic's) bay to the east and to panel and carpet the old offices. This basic plan was approved and we were also directed to modify the entrance so as to accommodate the handicapped- this then also involved modifying the restroom.

The staff went to work on design and drawings to best accommodate our needs within the constraints of the dollars and space. The following design objectives were drawn up:

A. Improve visitor contact area
   1. Handicapped access
   2. Interpretive displays
   3. Fee area operations/sales
   4. Waiting area

B. Staff meeting room/lunch room (no previous area) Area capable of accommodating programs to small groups (15 or 20)

C. Administrative offices
   1. Refuge assistant's work area
   2. Visitor counter (sales, leaflets)
   3. Communications system
   4. Computer work station
   5. Office safe, copy machine and files
   6. Storage of office supplies and references

D. Redesign the two inside restrooms to accommodate:
   1. Staff and handicapped use
   2. Build a kitchenette for coffee breaks and lunch room support function

E. Remodel staff offices with panelling and carpet

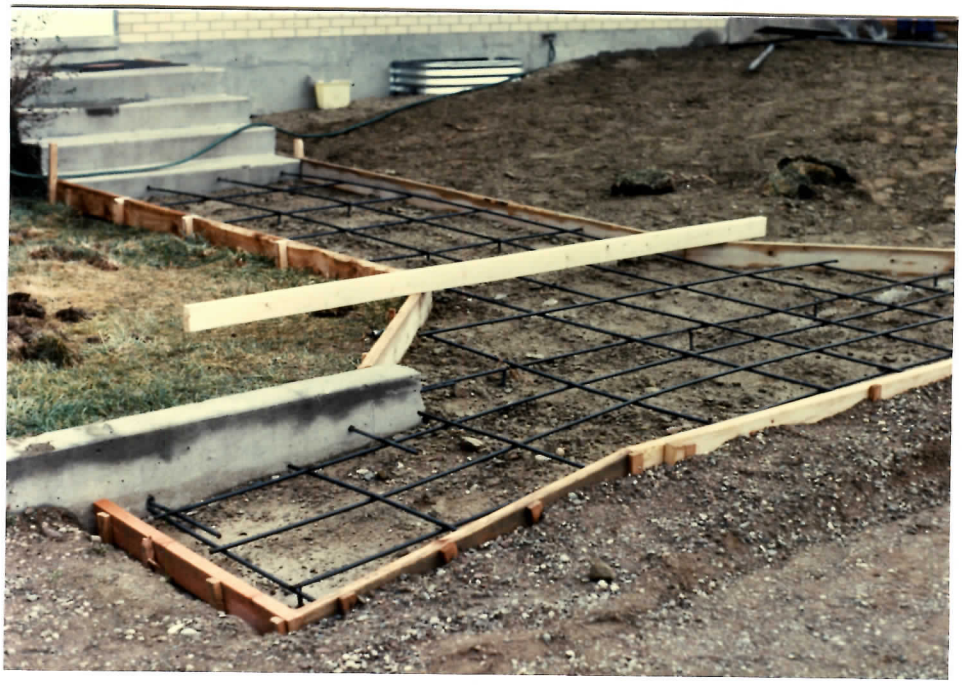
Lars Swensen, YCC, excavates along damaged foundation of office during this summer's office remodeling project.
88p-1-12 DL

The project was carried out force account, and like many projects of this nature, we didn't anticipate all of the time and costs involved. We found and repaired foundation problems and had to hire a special contractor to remove and make proper disposal of the asbestos ceiling tile in the entire building. Sub-contractors were used to 1) build and install the storage and display cabinets we designed; 2) extend the hot water heating system into the new office area (the "mechanic's bay" was unheated); 3) sheet rock, dry wall and texture the ceiling; 4) lay the carpet; 5) lay brick and block to fill in the old north windows.

The finished product, as illustrated in the photographs, is a modern office in which visitors can be made to feel welcome and receive information on our programs. We previously had no suitable space for staff meetings or for coffee and lunch breaks. The entire staff deserves commendation for a job well done.

Site preparation (compaction) for footings for the new entrance into the expanded office.
(Nies, Dirks and Marko)
88-17-5 TP

The office operations (furniture, supplies and equipment) were temporarily moved to the new maintenance office and carpentry shop area during the remodeling project. We moved back into the greatly improved facilities the first week of October.



The heaved sidewalk at the old entrance was removed and redesigned to blend in with the wheelchair ramp.
88-11-28 KD

Concrete being placed into the forms for the sidewalk and ramp.
88-20-164 10/17/88 KD

Framing and insulation detail on the south wall in the expanded section of the office. Pipe in floor is part of the expanded hot water heating system.
88p-1-2 RLP

The LaFromboise brothers subcontracted the sheetrocking, perfataping and ceiling texturing after the refuge staff completed the framing, plumbing and wiring.
88p-1-22 RLP

The new staff room provides the refuge crew with a place to eat lunches, take coffee breaks, hold staff meetings and undertake special projects without sitting on the secretary's desk. Side offices were panelled and carpeted.
88p-4-17 RLP

The new computer work area includes furniture, space and oak storage cabinets to hold paper supplies, manuals and reference materials.
88p-4-18 RLP

Our new "visitor friendly" reception area contains leaflet dispenser, enclosed display cases, wall displays, fee area sales counter and a comfortable waiting area. The office restroom was remodeled to accommodate wheel chairs.
88p-4-12 RLP

Refuge Assistant Benway has a much improved work area and was happy to give up her old metal gray desk for this new oak model.
88p-4-13 RLP

Some $37,000 of concrete arch pipe (54" x 72") was delivered to seven farm crossing structure sites along Lake Creek. The twin galvanized metal pipes (48" x 66") have deteriorated and will be replaced over the next several years. The new single unit concrete design should reduce weed plugging and be a more permanent structure. The metal rmp's have been in place since 1960.

Delivery of $37,000 of concrete arch pipe spells the beginning of another rehab project. Seven farm crossings along our water delivery system need replacement of the twin corrugated metal pipes.
88-17-25 RLP

At the Muddy Creek pumping station a new set (130) of check dam structure boards were built and installed. The refuge hired an electrician to work with Montana Power Company in converting the electrical service lines from bare overhead cables to an underground system which greatly reduces the hazard to employees.

Muddy Creek pumping station showing the overhead (bare) power lines from the power substation. These were removed and replaced with an underground service, thus greatly reducing electrical hazards to refuge employees.
88p-3-6 06/22/88 RLP

The auto tour route was upgraded this year with pictorial markers to help the visitor better understand the natural habitat and our management operations. With the imposition of a fee area operation, we feel obligated to move forward with improving the route even though specific funding was not available. We continued with the road widening project began last year so vehicles wouldn't have to drive off the edge of the gravel surface to meet or pass another vehicle. We placed 666 cubic yards of gravel on the newly widened section and planted grass and legumes on the newly cut borrow areas. An additional 700 cubic yards of gravel was purchased for the next segment.

Blow sand and manure (300 yards) were hauled in and mixed for use in landscaping improvements at headquarters and to improve garden plots at the quarters.

3. Major Maintenance

Routine servicing of heating systems, vehicles, landscaping and buildings as needed. Only minor repairs on all vehicles. The new 10 yard dump truck was outfitted with accessory items such as tool box, spare tire, chains, tow

hitch and mud flaps. The clutch was repaired in the Mack truck tractor. Road grading was few and far between because of the drought. The auxiliary pumping system required pipeline repairs. The pump station at Muddy Creek was shut down twice during the season to clean intake screens.

In October the Linehans moved out of Quarters 81. Taking advantage of this vacancy, the interior was cleaned, repaired, refinished and repainted. Carpets were commercially cleaned. The kitchen sink and faucet were replaced and the refrigerator was repaired. The premises will be filled by the next assistant manager.

Maintenanceman Patrick Nies doing finishing touchup work on Qtrs. 81 following the transfer of the Linehan family to McNary NWR in Washington.
88p-4-23 RLP

4. Equipment Utilization and Replacement

A 1988 one ton Chevrolet 4x4 pickup was received in March to replace the 1979 Dodge 4x4. Approval was obtained from GSA to retain this 79 Dodge through the summer season.

A 1988 Dodge Caravan was received in late May, without having to retrieve it from Fish Springs NWR ---- sometimes logic and persistence can prevail even in a bureaucracy where Murphy's Law hardly ever fails.

Two trade-in vehicles were turned in to GSA - the 79 Dodge and a 79 Luv and are scheduled for sale by GSA in January, 1989.

Surplus property received from Malmstrom Air Force Base was minimal - a large shop floor fan and a mechanic's tool chest.

5. Communications Systems

A separate electrical circuit was installed for the Merlin telephone system in the office following a power surge that damaged the $1500 unit in August requiring replacement.

Motorola finally came out with a practical low band radio monitoring system suited to our remote pumpsite monitoring needs. Now the problem is lack of funds. These units will monitor four functions and transmit preprogrammed voice messages to warn of changes in condition; i.e., pump #1 not operating, water too low, out of oil, security breach. The units sell for about $2,000 installed.

6. Computer Systems

Hardware: A new color printer was received and installed. A computer was leased to allow for summer work to proceed on nest survey records, contaminants and other projects that have been stalled by the lack of available computer time.

Software: The Polycom manual reads like a foreign language and the written instructions received from the Regional Office on how to use Compuserve electronic mail were incomplete and inaccurate thus leading to many hours of frustration at most field stations trying to get "on line". Once we got the bugs worked out of the procedures we then got all those "Green Sheets" automatically from Washington.

Great Falls Vo-Tech computer instructors Roger Stone and Jon Nietchke visited the refuge to assist us with dBase, Lotus 1-2-3, and electronic mail (EM) applications.

We are a long way from being "up to speed" with the software that we have now but wouldn't want to give any of it up. Its utility in managing masses of information is great. My appreciation to those who finally prevailed in the battles to get computers to refuge field stations - - - even if it is twenty years overdue.

7. Energy Conservation

The office remodeling included the removal of three large 4' by 8' windows on the north side of the building, thus

cutting energy losses. The design included improvements in insulation of floors and outer walls.

Three large windows on the north wall were removed and bricked in. A small window was installed for venting the office and to provide visual contact with the maintenance area.
88-17-20 09/30/88 RLP

8. Other

Our waste oil, mixed with solvent, can be disposed of to a site in Colorado for approximately $500 per 55 gallon barrel. We are looking into the purchase of a solvent distiller so we can recycle most of our used shop solvent and avoid future costs of shipping shop wastes to Colorado. We suggest that a solvent still (approximately $3500) be purchased and used by several refuge field stations.

J. OTHER ITEMS

1. Cooperative Programs

Wheat illegally harvested from a CRP field was obtained (350 bushels) through the Glasgow office of the Montana Fish, Wildlife and Parks Department and will be shared with Bowdoin NWR. It will be used for baiting duck (banding) traps.

4. Credits

Benway compiled and drafted Sections B and E 1-5 and used the WordPerfect computer files on Monthly Activity Reports (written by Linehan) to gather most of the information for 1988 into Narrative Report outline. Kristi DuBois compiled most of the sections on duck production, marsh and water birds, shorebirds, etc. (G 3-7) and G 17 on botulism. Her report abstract on selenium studies was used in Section D 5. Clarke Dirks' data on duck banding and on animal control was used in G 15 and G 16. Pearson composed and compiled the rest of the report, selected the photos and wrote the captions. This appears to be his last narrative report effort prior to taking an early out. You can be assured he won't miss this part of the job. Editing by Pearson etal. Benway typed the final on the Zenith word processor and assembled the reports.

K. **FEEDBACK**

REVIEW AND APPROVALS

BENTON LAKE WETLAND MANAGEMENT DISTRICT

Great Falls, Montana

ANNUAL NARRATIVE REPORT

Calendar Year 1988

Refuge Manager	Date	Zone Supervisor Review	Date

Regional Office Approval	Date

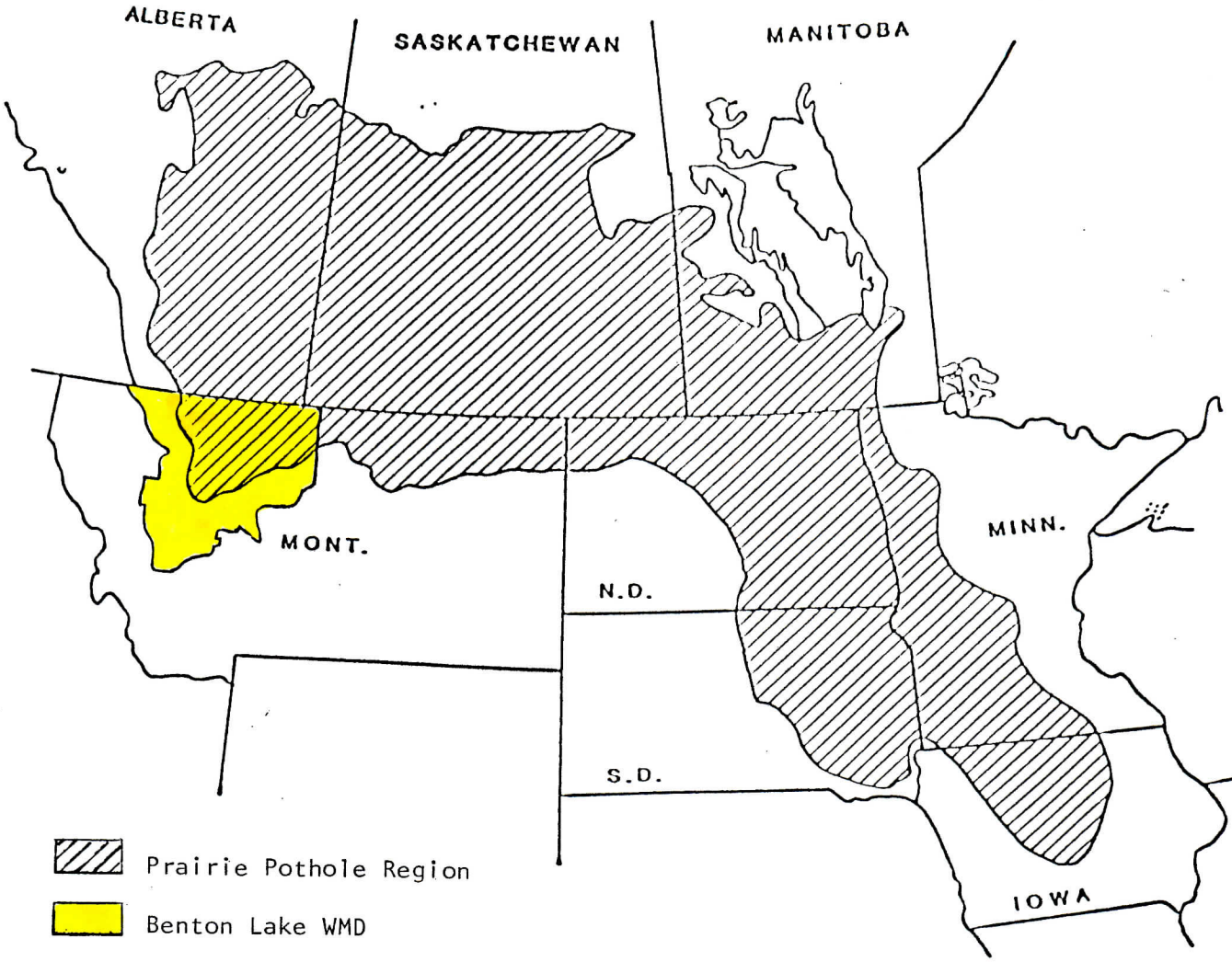
INTRODUCTION

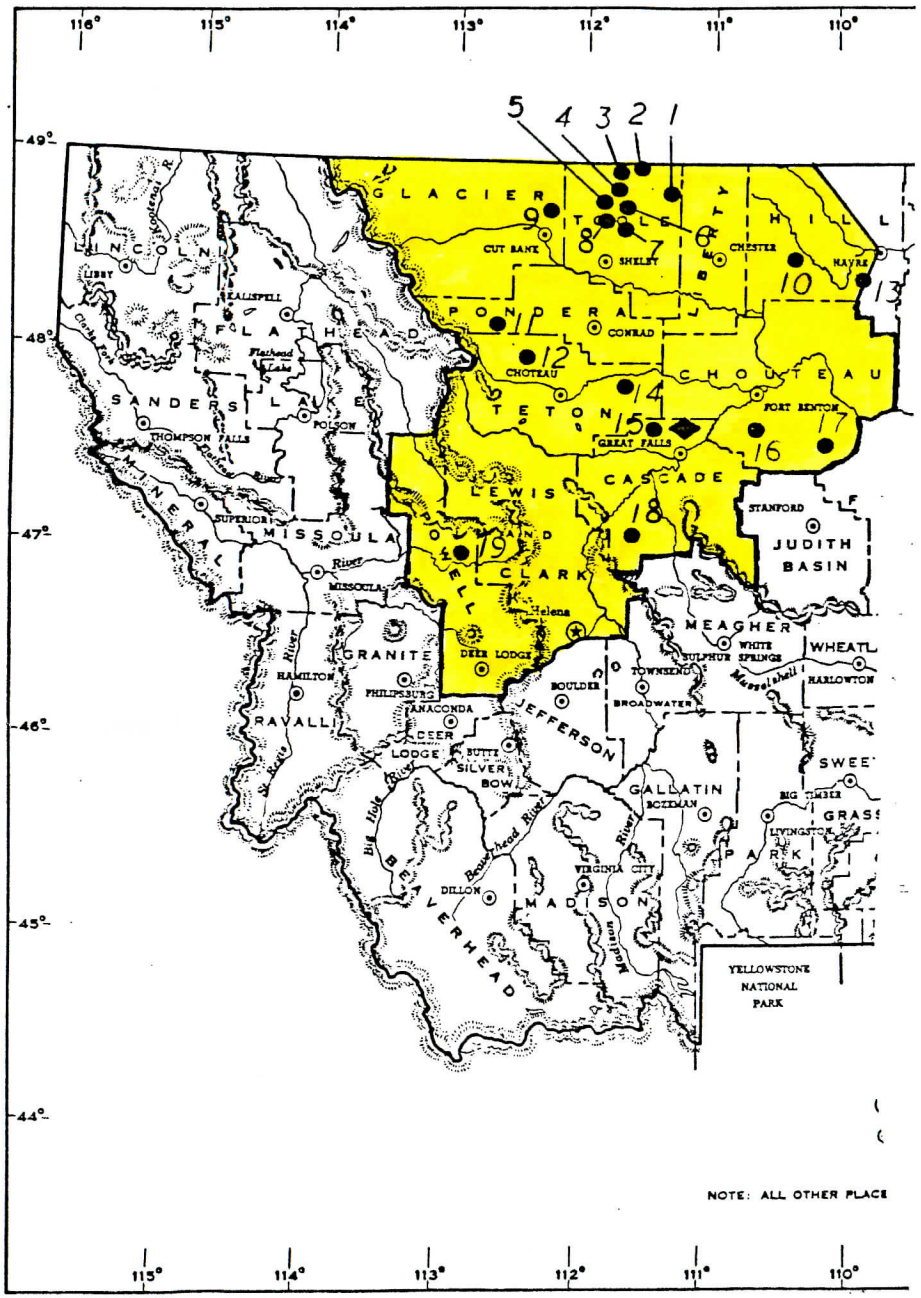
The Benton Lake Wetland Management District (WMD) was established in 1975 to initiate the Small Wetlands Acquisition Program in north-central Montana. Stretching across ten counties, the WMD is spread over 25,000 square miles, an area roughly the size of West Virginia. Topography within the district ranges from mountainous terrain in the west, to the short grass prairie of the northern Great Plains in the east.

Initial wetland delineations were started in 1966 and completed in 1975. Some 48,000 acres were delineated for fee purchase proposals. Acquisition began in 1974, with the majority of the easements and fee title tracts being acquired between 1975 and 1981. Since then, acquisition efforts have focused on acquiring wetlands with more permanent water and roundouts of existing waterfowl productions areas (WPA's).

Management responsibilities on the district include 19 WPA's totalling 12,604 acres. These tracts are widely scattered across eight counties and range in size from 80 to 3,734 acres. The average driving distance to our WPA's from headquarters is 90+ miles, making management difficult to say the least. Two WPA's are located 120 miles away - each in opposite directions.

Perpetual wetland easements are scattered across all ten counties. Easement tracts cover nearly 90,000 acres of private land protecting 7,088 acres of wetlands from drainage, burning and fill.


ALBERTA
SASKATCHEWAN
MANITOBA
MONT.
N.D.
MINN.
S.D.
IOWA
Prairie Pothole Region
Benton Lake WMD



MONTANA

BENTON LAKE WETLAND MANAGEMENT DISTRICT

◆ Benton Lake National Wildlife Refuge

● Waterfowl Production Areas

1.	Furnell	1995.00 Ac
2.	Ehli	475.24 Ac
3.	Danbrook	327.00 Ac
4.	Dunk	80.00 Ac
5.	Brown	260.60 Ac
6.	Long Lake	645.66 Ac
7.	Blackhurst	320.12 Ac
8.	Cemetery	108.58 Ac
9.	Peterson	94.20 Ac
10.	Hingham Lake	280.00 Ac **
11.	Jarina	640.00 Ac
12.	Savik	397.00 Ac
13.	Sands	378.93 Ac
14.	Brumwell	251.50 Ac
15.	Hartelius	307.22 Ac
16.	Big Sag	349.58 Ac *
17.	Kingsbury Lake	3733.69 Ac *
18.	Schrammeck Lake	420.24 Ac
19.	North Fork	1539.60 Ac
		12,604.16 Ac

* These tracts contain acreage held under BLM and State ownership.

** Leased from the State of Montana

INTRODUCTION

TABLE OF CONTENTS

G. WILDLIFE

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

Page

J. OTHER ITEMS

K. FEEDBACK Nothing to Report

L. INFORMATION PACKET (inside back cover)

A. HIGHLIGHTS

The drought of 1988 went down in the record books as the worst ever for north central Montana. This, combined with the previous five years of drought, has left a dismal picture for wetlands and waterfowl in the district (F2).

The most important roundout in the district was acquired with the assistance of The Nature Conservancy, Montana Department of Fish, Wildlife and Parks and the Montana Department of Highways. The 1540 acre North Fork WPA is now the "crown jewel" of the WMD (C1).

Much of the district work focused on the Farm Bill program. Some 629,275 acres of highly erodible cropland in the WMD have been enrolled in the Conservation Reserve Program (E7).

Three easement violations were detected, one of which includes a major fill case involving the disposal of pesticide containers (F13).

The Jarina WPA became involved in a congressional inquiry regarding a proposed land exchange (C1).

The first FmHA conservation easement was recorded for the district (C2).

The last remaining cropland (28 acres) in the WMD was seeded to dense nesting cover (F4).

B. CLIMATIC CONDITIONS

Specific climatic conditions are discussed in the refuge narrative report. However, due to the size of the district, conditions vary considerably across the ten county area. The only weather data collected for the WMD are precipitation records from several National Weather Service (NWS) reporting stations.

TABLE II

PRECIPITATION RECORDS FOR SELECTED NWS REPORTING STATIONS

County (Station)**	1988 Total	Normal	Percent of Normal
Cascade (Great Falls)	11.80	15.24	77
Chouteau (Ft. Benton)	10.67	14.60	73
Glacier (Cut Bank)	9.12	11.99	76
Hill (Havre)	6.38	11.16	57
Lewis/Clark (Augusta)	9.19	13.64	67
Liberty (Chester)	7.27	10.65	68
Pondera (Conrad)	8.94	12.10	74

** No reporting stations in Toole, Teton or Powell Counties.

Poor winter snow pack and a dry spring resulted in well below normal precipitation for the year. Montana has experienced nearly six straight years of drought, with 1988 being the driest year on record for north central portion of the state.

All but two counties in the district were declared disaster areas as a result of the drought. Parts of the state received no measurable precipitation during the entire growing season. Spring grain crops were nearly a total loss in some areas.

Forest fires raged across Montana's parched timber and rangeland in late summer, as some 872,300 acres burned. The Canyon Creek fire in the western portion of the district exploded from 45,000 acres to 250,000 in just 48 hours. This fire, which threatened the town of Augusta and destroyed cattle, fences and winter pasture on several ranches, crept within 2 miles of the North Fork WPA in Powell County.

The fire danger became so severe that the Governor postponed the scheduled hunting season and placed a ban on all non-essential outdoor activities until adequate rains were received. Total wildfire suppression costs in the state exceeded $ 68,000,000.00

Drought conditions statewide resulted in many CRP seeding failures and extensive wind erosion.
88P-05-32 09/20/88 GLS

C. LAND ACQUISITION

1. Fee Title

The wetland district currently has 19 WPA's totalling 12,604.16 acres (Table I). This total includes 10,381.68 acres held in fee title with the remaining acreage under Bureau of Land Management (BLM) and state ownership. The 280 acre Hingham Lake County WPA is leased from the State of Montana.

TABLE I

FEE TITLE ACRES BY COUNTY

County	Acquisition Goal	Number of WPA's	Total Acres
Toole	4,675	8	4,212.20
Chouteau	2,500	2	2,140.79*
Cascade	2,000	2	727.46
Hill	1,000	2	378.93**
Teton	2,251	2	648.50
Pondera	2,000	1	640.00
Powell	1,300	1	1,539.60
Glacier	2,096	1	94.20
Liberty	2,000	0	0
Lewis & Clark	500	0	0
Totals	20,322	19	10,381.68

*An additional 1,942.48 acres of State and BLM lands are contained within WPA boundaries.

**An additional 280 acres are leased from the State of Montana (Hingham Lake WPA).

a. North Fork Tract

One of the most important acquisitions in the district was finalized this year. A 1,240 acre roundout of the McCormick WPA in the Blackfoot Valley of Powell County was completed on May 23. The acquisition, which involved a cooperative purchase of the North Fork Ranch, would not have been possible without the efforts of The Nature Conservancy (TNC), Montana Department of Fish, Wildlife and Parks (MTDFWP), Montana Department of Highways (MDOH) and a private Billings businessman.

The ranch was foreclosed on by Farm Credit Services in January and scheduled to be sold within 60 days. We were told by the R.O. that nothing could be done due to the short time frame. In spite of this, Montana Reality Specialist Rich Johnson worked out the details to secure the necessary funding. The ranch was purchased by TNC who used $100,000.00 of MDOH wetland mitigation funds contributed by MTDFWP. A private individual agreed to purchase the north parcel of the ranch which was of no value to the Service.

b. Jarina Land Exchange

A second land exchange involving the Jarina WPA was proposed to the Service by an adjacent landowner in 1987. The exchange would have involved trading 440 acres of private land for 340 acres of the WPA. The proposal surfaced again in 1988 in the form of a "congressional".

Initially the exchange appeared to have benefits to the Service, including a net gain in wetland acreage and the disposal of the old Jarina homestead which would have been costly to clean up. However, a closer inspection of their property revealed that we would be losing our more permanent water while only gaining seasonal wetland acreage (Type I's). Their tract also contained shallower soils resulting in poorer nesting cover and overall range condition.

In September of 1987 ARM Sullivan and Realty Specialist Rich Johnson met with the landowner to inform them that the Service was no longer interested in the land exchange. Although they expressed their disappointment, there didn't appear to be any hard feelings. We were told that their primary reason for pursuing the exchange was a concern over trespass hunting from the WPA.

Apparently they discussed their dissatisfaction with the Service's decision to Congressman Ron Marlenee during a local "listening session" held in April. This prompted a congressional inquiry into the matter. Much to our surprise the issue of concern was that of grazing, not public access or trespass hunting. The landowners accused the Service of buying up "good grazing ground" and being poor custodians of our WPA's. They also accused us of telling them not to graze their property until the exchange was finalized.

Director Dunkle received the first congressional, followed by a second one sent to Regional Director Buterbaugh. In both cases we responded with our justification and rebuttal to the issues and accusations raised. Manager Pearson met with a field representative of Marlenee's office and Zone Supervisor Schranck contacted the landowners by phone in an effort to settle the matter.

It's obvious that their intent was to acquire better rangeland and more permanent water for their livestock operation. As a result of the drought, water and grass have become premium items not only for ducks, but also for livestock producers.

The last we had heard was the landowners were planning to meet with the Director. We hope that a sound biological decision will not be reversed as a result of "bio-politics".

c. Morrison Tract

No real progress was made on the proposed acquisition of the 1333 acre Morrison tract in the Sweetgrass Hills of Liberty County. The property lies in a glaciated pothole region along the Canadian border and contains an excellent wetland complex. The ascertainment report was approved but acquisition funds were not available. Initial realty work was completed and the Service is negotiating with the landowner. If acquired, this would be the first fee title tract in Liberty County.

2. Easements

No new wetland easements were acquired this year. Easements are scattered throughout all ten counties of the district. A total of 7,088 wetland acres are protected on 133 tracts (Table II).

TABLE II

EASEMENT ACRES BY COUNTY

County	Easement Tracts	Wetland Acres
Toole	56	2,933
Glacier	44	1,816
Liberty	9	428
Pondera	8	601
Hill	6	407
Cascade	4	78
Powell	2	507
Lewis & Clark	2	247
Teton	1	50
Chouteau	1	21
Totals	133	7,088

The first FmHA conservation easement was acquired in the district. A tributary of Muddy Creek in Teton County was placed under easement along with 12 acres of cropland which will be retired and seeded to permanent cover. The easement places full boilerplate protection on both the floodplain and 12 acre buffer zone. For additional information on FmHA easements refer to Section E,7.

The first FmHA conservation easement in the WMD places protection on this tributary of Muddy Creek. Twelve acres of cropland were included as a buffer zone and will be seeded back to permanent cover.
88-14-36 06/27/88 DLL

D. **PLANNING**

2. Management Plans

Annual plans completed and approved for the district included the Annual Work Plan and Pesticide Use Proposals.

A background and operations statement was developed as part of a regional refuge planning exercise.

A "wish list" of district work projects was submitted to the R.O. for inclusion into the Project Master List database. Funding is needed to complete several projects (totalling $82,000) including island construction, cover establishment, WPA site clean up, fence construction and parking lot development.

Long term management goals for the district correspond to those of the small wetlands program. Short range development plans are completed for each WPA. Lack of adequate funding and manpower has limited most of our management activities to posting; fencing and conversion of cropland to dense nesting cover.

We hope to complete resource inventories of all WPA's in the future. This information will be used to develop a brief (1 page) management plan for each WPA. Such plans would help to provide future direction and continuity of management activities.

4. Compliance with Environmental and Cultural Resource Mandates

a. BIO/WEST Powerline Study

Coordination continued with the Western Area Power Administration (WAPA) on the Great Falls-Conrad 230 KV transmission line. The powerline crosses through the Lake Creek Flats area of the district where high waterfowl densities have been known to occur. We continued to evaluate the bird strike study initiated by Bio West, Inc. See Section D,5a of the refuge narrative report for additional details regarding the project and study results.

In 1987 comments were also provided on an EIS for a second WAPA transmission line proposed between Conrad and Shelby. Construction began this year on the line which will cross the Marias River and a wetland complex in the Shelby area. We recommended mitigation for waterfowl losses instead of another bird strike study. Apparently no study or mitigation was considered by WAPA.

b. Cultural Resource Evaluation - Jarina WPA

A cultural resource evaluation was completed for the old homestead on Jarina WPA. ARM Sullivan met with U.S. Forest Service Archaeologist Gary McLean to inspect the homestead in August. McLean assessed the site to determine if it was eligible for listing on the National Historic Register. The issue regarding the eligibility of the buildings surfaced during a congressional inquiry involving the WPA.

A cultural resource inventory and eligibility report was submitted to the Montana Historical Society. Our recommendation to the State Historic Preservation Officer (SHIPO) was to dispose of the buildings since they constitute a public safety hazard and lack the physical integrity to meet eligibility criteria.

The SHIPO requested additional information on other homesteads in the area and commented that the site appears to have some historical significance even though it lacks physical integrity. Information on other homesteads in the county which better represent historical sites was submitted. At the end of the year we were still waiting for their concurrence on our recommendation to proceed with the disposal.

5. Research and Investigations

a. Saline Seep Monitoring

Saline seeps continue to be a serious problem in north-central Montana. These low volume springs develop due to changes in land use from rangeland (native perennial vegetation) to dryland farming. The seeps are caused by the inefficient use of annual precipitation on the up-slope or recharge area. The degradation of water quality and wetlands from seeps within the district, is a result of the fallow cropping practice used throughout much of the state.

In 1981 we began working with the Triangle Conservation District (now called the Montana Salinity Control Association) on two WPA's where seeps are a problem. A series of shallow cased wells were drilled on the Brumwell and Long Lake WPA's for the purpose of monitoring sub-surface water tables. Wells are measured twice a year to track changes in ground water levels as a result of our revegetation (DNC planting) of recharge areas. Unfortunately, farming practices on adjacent private lands continue to recharge our seeps making progress on reclaiming these areas difficult.

One positive note towards the reclamation of saline seeps is the conversion of some 2.7 million acres of cropland in the state to permanent cover under the Conservation Reserve Program (CRP). Many seep recharge areas will be revegetated under this program. Several large blocks of cropland adjacent to Long Lake WPA were accepted into CRP. Revegetation of these areas should help reduce the discharge of saline water into the Long Lake basin while also improving nesting cover in the area.

No additional selenium sampling was done on the district this year. Nine WPA's were sampled in 1987 where there is a concern of potential contamination from saline seeps as well as agricultural runoff. Preliminary results indicated no significant problems (yet) on the WMD. One avocet taken from Kingsbury Lake WPA did have elevated selenium levels present in the liver (22 ppm). Selenium concentrations in this range are known to cause reproductive problems in waterfowl. The final report was scheduled to be completed this year but was postponed due to personnel changes in the Fish, Wildlife and Enhancement division. Additional follow up sampling is planned for several WPA's. For further information regarding the contaminant study see section D.5c of the refuge narrative.

E. ADMINISTRATION

1. Personnel

b. Selenium "Hot Spot" Study

No additional selenium sampling was done on the district this year. Nine WPA's were sampled in 1987 where there is a concern of potential contamination from saline seeps as well as agricultural runoff. Preliminary results indicated no significant problems (yet) on the WMD. One avocet taken from Kingsbury Lake WPA did have elevated selenium levels present in the liver (22 ppm). Selenium concentrations in this range are known to cause reproductive problems in waterfowl. The final report was scheduled to be completed this year but was postponed due to personnel changes in the Fish, Wildlife and Enhancement division. Additional follow up sampling is planned for several WPA's. For further information regarding the contaminant study see section D.5c of the refuge narrative.

E. ADMINISTRATION

1. Personnel

The ten county district is administered by personnel at Benton Lake NWR and does not receive separate funding. Effective management of the district is tough due to the small staff and the scattered locations of the WPA's over such a large area. Just the logistics of completing force account projects and the "daily" management responsibilities on the WMD is often difficult.

A temporary biological technician was hired this year to assist the WMD manager with various force account projects. Tom Pabian entered on duty on April 11 and spent much of his 8 month appointment on WPA fence construction and miscellaneous refuge projects.

A backlog of WPA maintenance and development projects continues to grow, unless additional funding and personnel are received the problem will only worsen.

Refer to the refuge narrative report for further information on personnel and funding.

2. Youth Programs

The district has no separate youth program but refuge YCC enrollees assisted with several small WPA maintenance projects (see Section I.2).

7. Technical Assistance

a. Farm Bill Program

A major portion of the district work load this year involved activities associated with the Farm Bill program. Several WMD projects were put on hold to take advantage of the potential wildlife benefits offered in the conservation provisions of the 1985 Food Security Act. ARM Sullivan was assigned to the Montana Farm Bill program for 6 months at the beginning of fiscal year 1988.

Meetings were held with all Soil Conservation Service (SCS) and Agricultural Stabilization and Conservation Service (ASCS) offices in the district to discuss the Service's involvement with the Farm Bill. It took time to develop rapport with agencies who we have had little interaction with in the past.

The Conservation Reserve Program (CRP) was responsible for putting over one-half million acres of highly erodible cropland in the district back into permanent cover (Table III). Unfortunately much of this acreage was seeded to monotypic stands of crested wheatgrass. We met with SCS staffs and participated in a number of CRP workshops to encourage the use of a dense nesting cover mix on CRP tracts located in wetland complexes. A "piggyback" leasing program was authorized to pay landowners an additional $ 5.00/acre to seed a DNC mix on CRP tracts located adjacent to wetlands. This was a one-time payment to supplement the ASCS cost sharing for cover establishment. The drought forced many CRP enrollees to postpone CRP seedings but 143 acres were piggybacked using Farm Bill funds.

TABLE III

TOTAL CRP ACREAGE WITHIN
THE BENTON LAKE WMD

County	No. Farms	Acreage
Chouteau	301	128,758
Toole	261	110,852
Hill	254	97,646
Liberty	167	71,750
Teton	226	68,180
Cascade	223	59,991
Glacier	127	52,490
Pondera	120	31,099
Lewis & Clark	29	8,508
Powell	0	0
Totals	1,708	629,274

Newsletters and fact sheets encouraging landowners to "do something for wildlife" on their CRP lands were developed and distributed to all USDA offices. Habitat projects completed on private lands included the restoration of approximately 60 acres of wetlands, construction of 3 nesting islands and one peninsula cut-off. All work was done force account using 1120 (Farm Bill) funds.

Engineering Equipment Operator Marko puts the finishing touches on a nesting island built in an productive reservoir on private land in Chouteau County.
88-16-19 10/20/88 GLS

Other activities associated with the Farm Bill program included technical assistance and interaction with the SCS and ASCS on various wetland issues. We were involved in a number of SCS workshops and wetland training sessions. Several SCS offices requested assistance with wetland determinations. This gave us an opportunity to explain the importance of wetlands to new SCS employees and private landowners.

We assisted SCS personnel with several wetland determinations in the district. This landowner requested approval to drain this area for small grain production.
88P-8-19 08/18/88 GLS

A closer look shows the typical mottled coloration of hydric soils. Drainage of this site for commodity crop production would violate the Swampbuster provision of the Food Security Act.
88P-8-18 08/18/88 GLS

We participated in wetland training workshops for new SCS employees faced with the task of writing conservation plans for millions of acres of land in the state. Although dry, the Sands WPA was used as a demonstration area to look at hydric soils and hydrophytic plants.
88P-07-88 06/21/88 GLS

Our interaction with ASCS was not as positive. A number of swamp and sodbuster violations were reported but often a loophole in the legislation or some "local politics" resulted in the loss of additional wetlands or native sod. This has proven to be one of the most frustrating aspects of Farm Bill work.

Wetland drainage in Montana has not been as extensive as that in the Dakotas or Minnesota. Although there are surely swampbuster violations out there, it is extremely difficult to monitor a state so large with so few people. We were involved in one Commenced Determination case in the southern part of the state. The Gallatin County Committee approved a drainage project which we appealed to the State ASCS Committee. The outcome of the appeal is expected in early 1989.

Sodbusting is a much more prevalent problem in the state. In most cases it is being done under approved conservation plans, but yet much of the land is only marginal for small grain production. Often the landowner enrolls in CRP and then begins to break native sod to protect his cropland base. A change in the 1990 Farm Bill will be necessary to address this problem.

Large chunks of Montana's native (highly erodible) prairie continues to be destroyed in spite of the Sodbuster provision of the Food Security Act.
88-05-37 04/15/88 GLS

The Memorandum of Understanding between Farmers Home Administration (FmHA) and the Service offered an excellent opportunity to protect important resources on FmHA inventory properties nationwide. Eight properties in the district were inspected but most contained only dryland crop acreage. One conservation easement was approved and recorded in Teton County. Full boilerplate protection was placed on a tributary of Muddy Creek and twelve acres of adjacent cropland will be retired to establish a buffer zone. The easement boundary was fenced in September to exclude the area from livestock grazing. As part of his Farm Bill work, ARM Sullivan traveled statewide to inspect several other FmHA properties.

A land transfer is being recommended for this FmHA property near Bridger, MT in the southwest portion of the state. The tract includes three miles of the Clark's Fork of the Yellowstone River (pictured) and some 40 acres of wetlands.
88-16-01 10/19/88 GLS

b. Kleinschmidt Lake Ducks Unlimited Project

In May, Bio Tech Pabian and ARM Sullivan assisted the Montana Department of Fish, Wildlife and Parks (MTFWP) and Bureau of Land Management with the planting of 500 Wood's rose seedlings on the Kleinschmidt Lake Ducks Unlimited (DU) island. The DU island was part of a Bonneville Power Administration (BPA) mitigation project completed in 1986. The project compensates for waterfowl losses resulting from the construction of a power line across the Missouri River in the Helena Valley. Extremely rocky soil conditions on the island made planting the seedlings difficult. Two plots were planted to establish some nesting cover on the otherwise bare island. Most of the seedlings survived and began to flourish despite drought conditions in the area.

We assisted with the planting of Wood's rose seedlings on a Kleinschmidt Lake island built by Ducks Unlimited as part of a BPA mitigation project. The effort also included personnel from the Montana Department of Fish, Wildlife and Parks and the BLM.
88-07-33 05/03/88 GLS

8. Other Items

Revenue sharing checks for Fiscal Year 1987 were received in April. This year's payment dropped to 59% of entitlement. ARM Sullivan delivered checks to county commissioners in Toole, Cascade, Glacier, Teton and Pondera counties. No problems surfaced and all counties indicated their continued support of our small wetlands program. Checks were mailed to commissioners in Chouteau, Hill and Powell counties.

F. HABITAT MANAGEMENT

2. Wetlands

To sum it all up, 1988 was a disaster as far as wetlands were concerned. Water conditions continued to deteriorate from last years drought as no spring runoff or substantial rain occurred throughout much of the district. Only two WPA's (Jarina and North Fork) had water left by August and the remaining Type IV and V basins were beginning to dry up. Most easement tracts were dry and farmed through. Wetlands on the WPA's are in the poorest condition since the district was established. Many reservoirs and stock ponds on private lands dried up for the first time in decades. The future waterfowl production picture looks bleak unless significant precipitation is received in 1989.

Spring runoff was below normal on the North Fork WPA in the Blackfoot Valley of Powell County. The wetlands did manage to hold water long enough for broods to fledge.
88-7-11 04/19/88 GLS

Two WPA's have water control structures. One is located on Ehli WPA but cannot be used to manipulate water levels until a flowage easement or the affected private inholding is acquired. The other is situated adjacent to the Furnell WPA and is dependent upon the neighbor's willingness to divert water toward the unit. No water was available for use this year.

3. Forests

Acquisition of the North Fork ranch in Powell County added the first significant forest habitat to the district. Approximately 220 acres of ponderosa pine was included in the purchase. The timber lies on the south face of Marcum Mountain which includes some of the best elk winter range in the Blackfoot Valley. Management of this portion of the unit will be geared towards protection and enhancement of big game winter range. The combination of excellent waterfowl and big game habitat makes this a truly unique WPA.

A good portion of Marcum Mountain was included in the North Fork acquisition. This part of the unit contains some of the most important elk winter range in the Blackfoot Valley.
88-09-22 05/26/88 GLS

An additional 40 acres of riparian habitat, consisting mostly of aspen, cottonwoods and willow, along the Blackfoot River was acquired with the North Fork acquisition. Management of this habitat will concentrate on excluding the area from trespass livestock grazing by the adjacent landowner. The Blackfoot River crosses the south boundary on the WPA in several spots, making fence construction and maintenance nearly impossible due to periodic flooding.

4. Croplands

The cooperative farming program was phased out in 1987. This year the remaining 28 acres of cropland in the district was seeded back to dense nesting cover (DNC). Cropland on the Toole County WPA's was used in past years to alleviate crop depredations on surrounding private lands. With adequate nesting cover being a major limiting factor to production in the WMD, we felt that the lure crop acreage would be more beneficial to waterfowl if reseeded to permanent cover. Since 1978 we have converted 2,056 acres of cropland in the district to DNC.

A local cooperator was contracted to seed the 28 acres of cropland on Brown WPA to a mixture of tall wheatgrass, alfalfa and sweetclover. The seeding was done in mid April but severe drought conditions and hot temperatures in May and June may result in a stand failure. Kochia infestation became a problem in late June. The field was mowed to control the problem and it appeared that the alfalfa and sweetclover were still hanging on. The stand will be evaluated next year to determine if reseeding will be necessary.

A 68 acre DNC stand on the Sands WPA was disced to prepare the field for reseeding. The tract was seeded to DNC in 1984 which failed due to drought conditions. Since then the field has become severely infested with cheatgrass. Continued drought conditions over the last several years prevented reseeding efforts and resulted in a large build up of cheatgrass seed. It will be difficult to eradicate this annual without using chemicals. Our plans to seed a cover crop (spring barley) in late summer to prepare the seedbed did not materialize once again due to continued lack of adequate ground moisture. This would have provided some winter cover to prevent soil erosion and allowed us to reseed directly into stubble next spring. A spring seeding is planned if soil conditions are favorable.

5. Grasslands

The 19 WPA's currently contain 4,906 acres of native grassland. Grasslands are monitored and treatments prescribed when plant vigor begins to decline. No grazing, haying or prescribed fire treatments were applied in the district during 1988.

10. Pest Control

We are fortunate to have few problems with noxious weeds on the WMD. The majority of our WPA's have good competitive stands of cover which seem to prevent the invasion of most weeds. No pesticides were used this year, a trend we hope to continue.

Assistance was provided to the Montana Department of Livestock (MDOL) to control rabid skunks in Toole County. A den of rabid skunks was discovered on Brown WPA. The situation presented a public safety problem and we cooperated to remove the animals. Several counties along the Hi-Line have been declared rabies quarantine areas.

A complaint was received from the Hill County Airport Board regarding Richardson's ground squirrels on the Sands WPA. According to the Board, ground squirrels were creating safety problems on the runway of the adjacent airport. The Hill County Health Department requested approval to use strychnine on the WPA. An on site inspection revealed very little ground squirrel activity on our property. The source of the problem turned out to be an adjacent, overgrazed piece of airport land. We objected to the use of strychnine on or adjacent to the WPA and recommended the use of aluminum phosphide, a rodenticide which poses no threat of secondary poisoning.

13. WPA Easement Monitoring

Follow up work continued on the remaining 10 possible violations from the 1987 surveillance flight. Ground checks confirmed three additional violations (Table IV) bringing the total to eight for last year. This year's flight was postponed due to adverse weather and ground conditions. A 1989 spring flight is scheduled.

TABLE IV

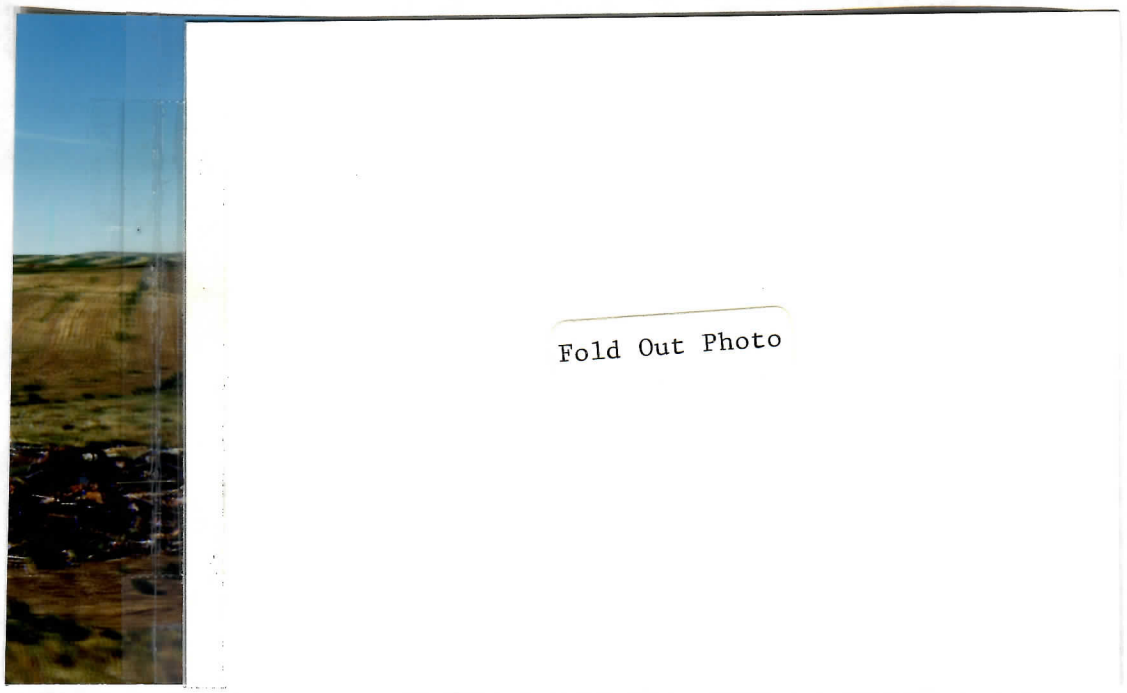
1988 EASEMENT VIOLATIONS

Easement Tract	Type Violation	Disposition
Glacier Co. 13X-1	Drainage	Wetland Restored
Glacier Co. 24X-1	Fill	Pending
Glacier Co. 42X-1	Fill	Pending

Additional details regarding two of the cases are worth noting. The initial contact with the landowner on the Glacier County 13X-1 drainage violation resulted in a threat to "shoot any government man who stepped on the property". ARM Sullivan returned with Special Agent Rod Hanlon to resolve the matter and set a compliance date. Much to our surprise, the second contact went smoothly and the basin was restored in May.

The drainage violation on Glacier County 13X-1 required the assistance of Special Agent Hanlon (background) after threats were made during the initial contact with the landowner. The basin was restored without any shots fired.
88P-04-30 05/31/88 GLS

A major fill violation was confirmed on Glacier County 24X-1. A type III basin, which had been used as a "family dump site" prior to taking the easement, has been expanded into an environmental disaster. Truckloads of pesticide containers, scrap building materials, junk machinery and household trash had been dumped into the basin. Some 115 pesticide drums/containers of carbamate (Sevin), lindane (DB Green), dicamba (Banvel), triallate (Fargo), ME4 brominal (Buctril), 2,4-D and 2,4,5-T were found. Most containers were not rinsed and disposed of in accordance with label regulations.



A major violation on Glacier County 24X-1 involving tons of fill material. The case also involved the disposal of some 115 pesticide containers into the wetland. The yellow 55 gallon barrels were once full of 2,4-D herbicide and many were not rinsed as required by EPA regulations. A disgusting sight to say the least.

88P-5-13 & 14 06/06/88 GLS

ARM Sullivan contacted the Glacier County Health Department, Montana Department of Agriculture (MDOA), Environmental Protection Agency (EPA) and Montana Department of Health and Environment (MDHE) for assistance. A MDHE contaminants team collected samples of container residues and soils to determine the extent of the problem. High concentrations lindane (4300 ppm), dicamba (3400 ppm) and other pesticides were found in several containers. Elevated levels of ethyl parathion (9.3 ppm), a highly toxic compound, were also found in soils surrounding the site.

The easement holder is a prominent local lawyer who claims that much of the material existed in the basin at the time the easement was taken. We concede that some of the material was there prior to the easement but have evidence to show that a great deal of the fill wasn't. The landowner has agreed to remove it but only wishes to push it up above the high water line.

Montana Department of Agriculture Pesticide Specialist Darrell Stankey collecting residue samples from a lindane (insecticide) container at the site. Test results indicated that containers were not rinsed posing a threat of contamination to water and wildlife in the area.
88-15-13 09/28/88 GLS

We have some serious concerns over possible leaching and groundwater contamination as a result of the dump site. Montana's laws regulating the disposal of pesticide containers on private lands are very weak. The MDOA and MDHE are still reviewing the case before deciding what action to take. At the very least, we would like to see the containers hauled to an approved landfill and the area declared an improper disposal site. We will require that all fill be removed from the wetland but there still is a need for stricter state laws to prevent these situations from occurring.

This skunk apparently met his demise in the form of carboxin, a fungicide used to treat small grains. We fully support predator control but this is going too far.
88P-03-32 06/06/88 GLS

Efforts continued to complete a routine ground check of all easements on a county by county basis. These inspections have resulted in the discovery of several violations which have been missed from the air. All basins on each tract are photographed and documented to provide base line data for future enforcement work. Inspections of all easements in Lewis and Clark, Hill, Cascade, Chouteau and Teton Counties have been completed. Landownership records are being updated and a computerized tracking program using Dbase III+ will be developed to monitor changes in easement ownership.

G. WILDLIFE

Specific survey data on wildlife populations within the district is limited due to its size and our small staff. Surveys are usually done incidental to district work projects.

1. Wildlife Diversity

The district contains waterfowl habitat in three distinct areas of the state. Most of the WPA's are located in the short grass prairie of the northern Great Plains. The Sweetgrass Hills near the Canadian border includes habitat characterized by high elevation, glaciated prairie (Furnell WPA). The intermountain glaciated wetlands and riparian habitat is represented by the North Fork (formerly McCormick) WPA in the Blackfoot Valley near Helmville, MT.

North Fork Acquisition

This roundout represents the most impressive increase in wildlife diversity on the district since its establishment in 1975. The tract encompasses a broad spectrum of habitat types including an impressive wetland complex, dense stands of ponderosa pine, cropland, sagebrush/grasslands and a riparian corridor along the Blackfoot River .

Some 14 species of ducks have been known to nest in this area, including canvasbacks, redheads, Barrow's and common goldeneyes, buffleheads and common mergansers. Other water birds observed here include pied-billed, horned and red-necked grebes and sandhill cranes. Upland game birds use includes blue and ruffed grouse. Unconfirmed reports of Columbian sharp-tailed grouse, a candidate endangered /threatened species for listing, have been made in this portion of the Blackfoot Valley. Winter range on the tract provides habitat for large numbers of elk and mule deer. Other resident wildlife species observed on the property include bobcats, mink, beaver, coyotes, black bear and porcupine.

2. Endangered and Threatened Species

Several sightings of bald eagles and peregrine falcons were noted throughout the district this year. Two eagles were seen on Schrammeck Lake WPA in March. The Blackfoot River area of the North Fork WPA continues to receive heavy use by bald eagles. The birds are attracted to the large number of road kills (deer) along Highway 200 which runs through the Blackfoot Valley. The Montana Department of Fish, Wildlife and Parks began placing road kill carcasses on an isolated portion of the WPA to reduce the number of eagles killed by vehicles on the highway. A peak of 42 birds were seen using the site in January. An active bald eagle nest is located approximately 2 miles east of the WPA.

Candidate species sighted in the WMD included the Swainson's and ferruginous hawks. The latter has been known to nest on Kingsbury Lake WPA in past years.

3. Waterfowl

The drought continues to take its toll on waterfowl populations in the district. Wetland conditions were so poor that no formal production survey was completed for the WMD. Based on a partial breeding pair count and occasional observations made incidental to force account work, production on the WPA's was "guesstimated" at 200 ducks and 15 Canada geese. The only water available for nesting was located on the North Fork and Jarina WPA's, as all other units were completely dry in 1988. This is the lowest production estimate for the WMD since the initiation of estimates in 1978.

In December, three round bales were placed on Schrammeck Lake WPA. Artificial nesting structures are also located on Big Sag and North Fork WPA's.

4. Marsh and Water Birds

Due to the drought and its impact on wetlands, marsh and water bird use in the WMD was extremely limited. Horned grebes were sighted on the North Fork WPA. Pied-billed, horned, eared and red-necked grebes have all been known to nest in the district.

Sandhill crane use on WPA's increased with the acquisition of the North Fork tract. Twenty-six birds were sighted feeding on the idle cropland of the new unit in April. Crane nesting has been documented on both the North Fork and Savik WPA's.

Bio Tech Pabian checking a goose nest on Jarina WPA. A portion of the old Jarina homestead served as an elaborate artificial nesting structure.
88-07-22 04/28/88 GLS

5. Shorebirds, Gulls, Terns and Allied Species

No estimates of use by these species is known for the WMD but lack of wetland habitat surely impacted local populations. Small colonies of Franklin's gulls and black terns have nested on Schrammeck Lake and North Fork WPA's in past years. Long-billed curlews were observed nesting on Schrammeck Lake WPA in July.

6. Raptors

Raptors which are regularly seen throughout the district include the golden eagle, prairie falcon, Swainson's hawk, American kestrel, marsh hawk and great horned owl. Raptors known to nest on several WPA's include the red-tailed hawk, short-eared owl and marsh hawk.

8. Game Mammals

Mule and white-tail deer populations continue to do well throughout much of the district. Mule deer were seen regularly on several WPA's. White-tails thrive in the riparian habitat of the North Fork WPA. Pronghorn antelope herds continue to grow in the Sweetgrass Hills area with fairly heavy use occurring on Furnell WPA. Twenty-nine "goats" were spotted on Schrammeck Lake WPA in July.

Elk winter on both the Furnell and North Fork WPA's. Acquisition of the North Fork tract placed some of the most important elk and mule deer winter range in the Blackfoot Valley under our management. Up to 150 elk were observed using the WPA in the late December.

A bobcat den, with two kittens, was discovered in May on the North Fork tract. Black bear tracks indicated bear use along the Blackfoot River. We continue to be impressed by the diversity of critters using this WPA.

10. Other Resident Wildlife

Sharp-tailed grouse, Hungarian (gray) partridge and ring-necked pheasants are found throughout the district. With such extensive farming in the area, our WPA's provide some of the best (and only) cover for upland game birds.

Sharp-tailed grouse leks are located on Jarina, Brown, Ehli and Long Lake WPA's. In May, 27 sharptails were observed dancing on the Long Lake lek. This lek is located on a saline seep discharge area. Hungarian partridge and sharptail numbers were up significantly in 1988 throughout much of Montana. Their populations have responded well to the mild winter and additional cover available on CRP lands in the state.

Pheasants have become established on the Danbrook WPA from bird releases in nearby Canada. Pheasant populations are doing well in the area. Approximately 25 birds were spotted in a DNC field on the Danbrook unit in September.

Coyotes, red fox, raccoon, badger, striped skunks, mink, weasel and prairie rattlesnakes are also found on the district. Although outside of its normal distribution, shed skins on North Fork WPA indicated the possible presence of western hognose snakes.

H. PUBLIC USE

1. General

Monitoring public use on the district is very difficult. Most of the information we receive is reported directly to our office or is obtained from WPA neighbors. Most people aren't familiar with the location of our isolated units resulting in mainly local use. There are no developed public use facilities on the WMD other than the parking lots at Sands and Schrammeck Lake WPA's.

ARM Sullivan was asked to participate on an advisory committee for the Marias River Landowner Sportsman Association this year. This group is working with the MDFWP to develop a "park and walk" hunting program in the Sweetgrass Hills portion of the district. Off-road travel and hunting from vehicles has been a problem here in the past. The goal of the program is to reduce this illegal activity, provide more quality public hunting on private lands and improve relations between landowners and sportsman. We fully support the program and provided some regulatory signs for private lands around Furnell WPA.

8. Hunting

Extreme fire danger forced the state to postpone all hunting seasons until adequate rains were received. The closure lasted roughly two weeks but seasons were extended to make up for the lost days.

All WPA's, except the Sand's unit, are open to public hunting in accordance with state regulations. Monitoring the degree of hunting pressure and success on WPA's is very difficult due to the size of the district. Most of the hunting pressure occurs during the upland game bird season. Hunter success has been relatively good on most WPA's since upland game populations have been relatively high in the past few years.

9. Fishing

The North Fork WPA is the only unit with a fishery resource. Fishing on the Blackfoot River, which winds through the south end of the WPA, is locally popular in the Blackfoot Valley.

The Furnell WPA once had a "fish pond" which was stocked by the state but a string of drought years has left it dry.

10. Trapping

Accurate information on trapping in the district is not available. Trapping of muskrats, raccoon and coyote occurs on several WPA's. The Blackfoot River portion of the North Fork WPA receives heavy trapping pressure according to the local state warden. This prompted us to take a closer look at the state trapping regulations for the area. Montana law permits open bait sets which often lead to the demise of many raptors. This poses a real threat to bald eagles wintering along the Blackfoot River. In order to prevent this problem on the WPA, trapping will be regulated by a Special Use Permit. No open bait sets will be permitted. The MTDFWP fully supports this idea and has agreed to handle the enforcement of the special regulations.

15. Off-Road Vehicling

The off-road vehicle trespass problem on the Furnell WPA was resolved this year. A private driveway and gas well access roads across the WPA creates the opportunity for this illegal activity. The Montana Power Company (MPC) has three access roads on the WPA which are used by hunters to "pursue" deer and antelope. ARM Sullivan met with MPC to discuss the problem. MPC Plant Foreman Merl Booth was very supportive of our park and walk policy and agreed to keep the access road gates locked year round.

There were no easy solutions to preventing off road trespass from a private driveway which bisects the WPA. The road is used daily by the adjacent landowner who was not receptive to the locked gate method. The only solution left was to fence both sides of the road which will also resolve a past problem with trespass grazing. A total of 1.5 miles of fence was constructed by force account. An additional 1.5 miles will be built next year to complete the job. We also plan to develop two parking areas, install additional regulatory signs and increase our enforcement efforts on the unit next year.

17. Law Enforcement

Trespass cattle continue to be a problem on both the Furnell and North Fork WPA's. Adjacent landowners know we're located nearly 100 miles away and frequently take advantage of "all that government grass going to waste". ARM Sullivan responded to several trespass cases involving the new North Fork unit. The individuals were contacted and the cattle removed. The problem was partially resolved with some fence construction.

For the first time, routine law enforcement patrols were conducted in the district during the upland bird and big game seasons. ARM Sullivan focused efforts in the Sweetgrass Hills area where off road vehicle trespass has been a problem. No vehicle trespass violations were noted on Furnell WPA. Some 77 hunters were checked in the field during the opening weekends of the antelope and deer/elk seasons. Sullivan teamed up with MTDFWP game wardens to operate a game check station. Four violations were detected (hunting without license, failure to tag, hunting without permission, taking of improper sex) and prosecution was handled by the state.

I. EQUIPMENT AND FACILITIES

New construction and maintenance projects in the WMD continue to be limited due to lack of adequate funding and personnel. Other top priority programs such as Farm Bill activities has only added to the problem. The size of the district also makes force account work difficult.

1. New Construction

This year's new construction efforts focused on fence construction. A backlog of fence projects was tackled using a three man force account crew. Nearly four miles of fence was constructed in 1988 (Table IV).

TABLE V

WMD Fence Construction in 1988

Location	Type	Length (miles)
Furnell WPA	Interior	1.5
Jarina WPA	Boundary	.75
North Fork WPA	Boundary	.75
FmHA Easement	Boundary	.50

All fences were of 3 or 4 strand barbed wire construction to control trespass livestock and off-road vehicling problems.

The boundaries of Jarina and North Fork WPA's were posted this year. Posting on the Jarina unit was delayed until the Jones land exchange was finalized. A parking lot and vehicle barrier were also constructed on the Jarina unit.

Bio Tech Pabian, Bio Aid Dirks and ARM Sullivan spent a good portion of the summer fencing in the district. This section of fence was built on the North Fork WPA to resolve a cattle trespass problem. The Canyon Creek wildfire (background) crept within 2 miles of the WPA as it burned some 245,000 acres.
88P-08-26 08/30/88 GLS

2. Rehabilitation

A major rehabilitation of an access road which bisects the Furnell WPA was completed this spring. The road is the only access to an adjacent neighbor's residence. During wet conditions the road is impassable forcing the neighbor to drive off through the grasslands. This was not only causing damage to the WPA but encouraging off road vehicle trespass by hunters. A deal was worked with the Toole County Road Department and the landowner to resurface the 1.5 miles of access road at no cost to the Service. The landowner agreed to let the county use a gravel pit on his property in return for the resurfacing work.

Several stretches of old interior fence (totalling 1.5 miles) were removed from Jarina, North Fork and Furnell WPA's. These projects eliminated several wildlife hazards and improved the aesthetics of the units.

YCC enrollees were used to clean up several junk piles on Big Sag and Jarina WPA's. Several dump truck loads of old building materials were removed, eliminating potential predator denning sites.

General boundary fence maintenance was completed on Schrammeck Lake and Big Sag WPA's. A backlog of fence maintenance projects continues to grow.

4. Equipment Utilization and Replacement

A 1988 one ton Chevrolet 4X4 pickup was received in March to replace the old 1979 Dodge pickup. This rig is equipped with all the necessary options needed for WMD operations.

A new Chevrolet 4X4 pickup was received for the district. The truck is a major improvement over the old 1979 Dodge rig.
88-07-37 05/09/88 GLS

6. Computer Systems

The FY 88 computer order for the station included a portable laptop for the district. This machine will greatly enhance the efficiency of collecting data in the field and serve as an additional work station in the office. We already have lots of ideas on how to put it to work on programs such as easement enforcement (tracking changes in ownership), Farm Bill, etc. The contracting problems with the order are extremely frustrating - can't somebody pull it together in the R.O. ?

J. OTHER ITEMS

4. Credits

This report was written and typed by Sullivan, edited by Martin and Pearson and assembled by Benway.